WORLD PETROLEUM
JUNE, 1946
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DOLLARS PER YEAR—FIFTY CENTS PER COPY

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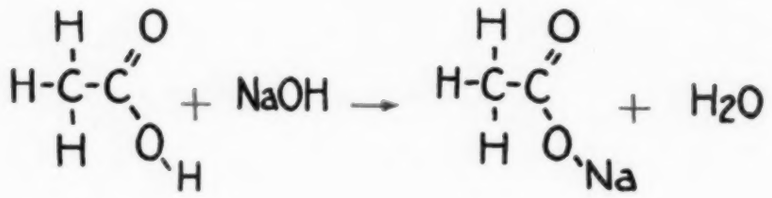

BROWN-BILT

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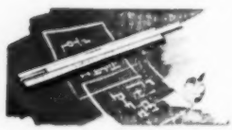
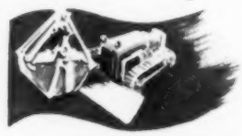


DESIGN +

ENGINEERING +

FABRICATION +



ERECTION

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EQUALS

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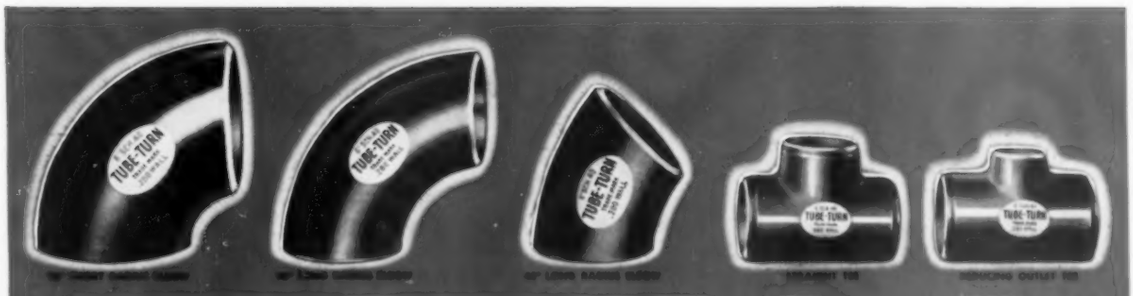


TUBE-TURN

TRADE MARK

WELDING FITTINGS AND FLANGES

TUBE-TURN WELDING FITTINGS—RANGE OF SIZES

Type of Fitting	Description	Standard Weight	Extra Strong	Schedule 160	Double Extra Strong	Light Gauge	
						Nominal Pipe Size	Iron Pipe Size
Elbows	90° Long Radius	½"-24"	½"-24"	1"-12"	¼"-8"	4"-24"	3"-12"
Elbows	90° Short Radius	1"-30"	1½"-30"				
Elbows	45° Long Radius	½"-30"*	½"-30"*	1"-12"	¼"-8"	4"-24"	3"-12"
Returns	180° Long Radius	½"-24"	½"-24"	1"-12"	3"-8"	4"-24"	3"-12"
Returns	180° Short Radius	1"-30"	1½"-30"				
Returns	180° Extra Long Radius	1"-2½"	1"-2½"				
Tees	Straight	½"-24"	½"-24"	½"-12"	½"-8"		
Tees	Reducing Outlet	½"-24"	½"-24"	½"-12"	½"-8"		
Reducers	Concentric & Eccentric	1x½-24x20	1x½-24x20		1x½-8"x6"		
Caps		1"-24"	1"-24"		1"-8"		
Stub Ends	Lap Joint	1"-24"	1"-24"				
Nipples	Shaped, 90° to Header	1¼"-12"	1¼"-12"				
Nipples	Shaped, 45° to Header	1¼"-12"	1¼"-12"				
Saddles		2"-24"**					
Laterals	Straight	1¼"-24"	1¼"-24"				
Laterals	Reducing-on-Run	1¼"-24"	1¼"-24"				
Crosses	Straight	¼"-24"	¼"-24"				
Rings	Welding	¼"-12"	¼"-12"				
Sleeves	Welding	2"-24"**					

SUPER Tube-Turn 45° long radius elbows, 90° long radius elbows, and 180° long radius returns available in both Standard weight and Extra Strong in sizes from 3" to 12".

Tube-Turn welding fittings and flanges conform to applicable ASA and ASTM Standards. For further details please refer to Tube Turns catalog and data book No. 111.

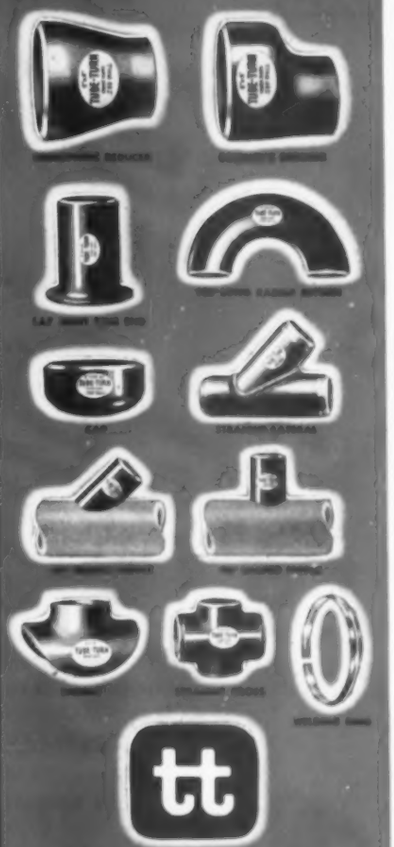
*30" size short radius

**Since saddles and sleeves are used for external reinforcement only, they do not conform to iron pipe size thicknesses.

TUBE-TURN FORGED STEEL FLANGES—RANGE OF SIZES

	150 Lb.	300 Lb.	400 Lb.	600 Lb.	900 Lb.	1500 Lb.	2500 Lb.
Welding Neck	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Slip-on	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Lap Joint	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Threaded	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Blind	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Socket Type	¼"-24"	¼"- 4"		¼"-3½"			
Reducing-threaded or slip-on	¾"-24"	¼"-24"	¼"-24"†	¼"-24"	¼"-24"*	¼"-24"	¼"-12"
Orifice—threaded		1"-24"	4"-12"	4"-12"	3"-12"	1"-12"	
Orifice—slip-on		1"-24"					
Orifice—welding neck		1"-24"	4"-12"	1"-12"	3"-12"	1"-12"	
Long Welding Neck	1"-24"	1"-24"	1"-24"	1"-24"	1"-24"	1"-24"	1"-12"

†Dimensions on sizes thru 3½" same as for 600 lb. flanges.
*Dimensions on sizes thru 2½" same as for 1500 lb. flanges.



Selected Tube Turns Distributors in every principal city are ready to serve you from their complete stocks.

TUBE TURNS (Inc.), Louisville 1, Kentucky. Branch Offices: New York, Washington, D. C., Philadelphia, Pittsburgh, Cleveland, Detroit, Chicago, Houston, San Francisco, Seattle, Los Angeles.

LIKE LOOKING FOR FAVORABLE FORMATIONS,

WITHOUT ADEQUATE GRAVIMETRIC METHODS!

Economy of usage — swiftness and sureness of assembling data — PRIMARY reasons why Gravity Meter Surveys come FIRST in scientific pre-drilling techniques!

Mayes-Bevan now offer their professional skill and experience along this line, for consultation with you on your problems.

MAYES-BEVAN COMPANY

GRAVITY METER SURVEYS

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WORLD PETROLEUM (including Petroleum Equipment Exporter) Vol. 17 No. 6, June, 1946. Entered as Second Class Matter at the Post Office at Orange, Connecticut under the act of March 3, 1879. Published monthly August to June, semi-monthly in July, at Boston Post Road, Orange, Conn. by Mona Palmer Trustee under will of Russell Palmer, 2 West 45th Street, New York 19, N. Y. Subscription price $5.00 per year, single copies 50 cents each.

...as your source of sulfuric acid

General Chemical Company pioneered the Contact Process of sulfuric acid manufacture in this country at the turn of the century, making possible the economical production of high strength acid and thereby stimulating resultant industrial development.

Through its progressive research and advanced production techniques, General Chemical has continued to supply constantly increasing demands of the Petroleum Industry for this basic chemical down through the years . . . meeting its most exacting requirements for sulfuric acid of all grades and strengths. That is why so many purchasing and operating executives specify "General Chemical" as their sources of sulfuric acid. Why not make it your choice, too.

SULFURIC ACID

Standard Grade:
66° Baume (93.19% H_2SO_4); 99% H_2SO_4

Other Grades:
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OLEUM

15, 20, and 65% free SO_3

Specify These Chemicals, Too!

Anhydrous Hydrofluoric Acid: Alkylation
Fluosulfonic Acid: Polymerization
Muriatic Acid: Oil Well Acidizing
Sodium Metasilicate—Disodium Phosphate—Trisodium Phosphate—Tetrasodium Pyrophosphate: Detergents
Aluminum Chloride Solution—Aluminum Sulfate: Treating Agents
Sodium Silicate—Disodium Phosphate—Trisodium Phosphate—TSPP (Tetrasodium Pyrophosphate): Mud Conditioning
Other Chemicals: Aqua Ammonia—Nitric Acid—Potassium Nitrite

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POWER

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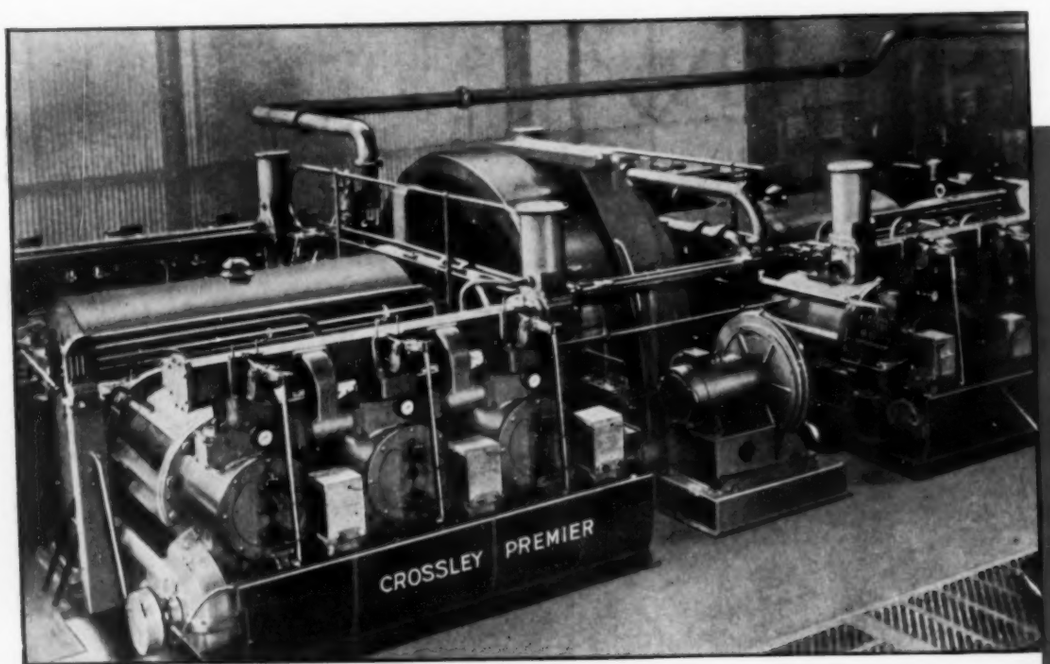
CROSSLEY-PREMIER

UP TO 4000 BHP



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RELIABLE ECONOMICAL
ACCESSIBLE SIMPLE

CROSSLEY-PREMIER ENGINES LTD

SANDIACRE, NR. NOTTINGHAM, ENGLAND

INTERNATIONAL

POWER "Produces" A Pipeline

The scene is in Texas, on an 87-mile stretch between Opelika and Carthage. The job—a 14-inch pipeline being laid by the Oklahoma Contracting Company for the Lone Star Gas Company. The working conditions are mud, swamps, and a lot of wet weather. And the power—in a variety of applications shown on this page—is INTERNATIONAL!

Above is one of the two Cleveland Trenchers that were on the job. These machines are powered with INTERNATIONAL UD-9 Power Units—dynamic, efficient full-Diesel engines, packed with power, built for long hours of work. International Diesel engines cut maintenance costs to the bone and their *instant-starting, full-Diesel* power is always ready to go at a moment's notice. You can be sure of top-notch performance from equipment that's *powered by International.*

Above: Two big International TD-18 Diesel Crawlers are holding the pipe while the dragline in the background is cleaning out the ditch. Here's proof of International's better balance since no counterweights could be used because of the soggy ground. Yet the big red crawlers handled the job smoothly under some of the worst conditions found anywhere—a real example of rugged, efficient mobile-power.

The pipe-cleaning machine, above, is powered by a carburetor engine—an INTERNATIONAL U-6 Power Unit. Like International Diesels, these precision-built engines are the product of advanced engineering design. They deliver efficient power for a variety of operations. The TD-18 at the left is filling in the ditch to finish the job—a project *powered by International* throughout. Let your International Industrial Power distributor give you the facts you need for powering your operations—with dependable International Power.

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CALTEX
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Better and Better Quality
PETROLEUM PRODUCTS for the MIDDLE and FAR EAST
CONSTANT research backed by extensive production, and refinery organizations assure you petroleum products of unsurpassed quality and uniformity. Caltex brings them to you conveniently — through its complete distributing service in the Middle and Far East — to insure efficiency and economy in all of your plant and equipment operations.

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Mines and mills that produce

Baroid Products

Fourth of a series of advertisements featuring our mine and mill facilities.

The FOUNTAIN FARM, MISSOURI processing plant of Baroid Sales Division, shown above, is one of the largest and oldest producers of BAROID for use in oil wells, in the United States. Near this plant are extensive mines, the sources of barytes of such high quality that much of it is used in the chemical industry.

BAROID and other Baroid Products, because of their efficiency, have saved hundreds of thousands of dollars for operators. Stocks are carried in nearly 450 locations in the United States and Canada.

FOUNTAIN FARM
MISSOURI

Other mines and mills are located at Hector, El Portal and Los Angeles, California; Osage, Wyoming; Magnet Cove, Arkansas; Texarkana, Tex.

BAROID PRODUCTS

ANHYDROX • AQUAGEL • AQUAGEL CEMENT • BAROCO • BAROID • FIBERTEX IMPERMEX • MICATEX • SMENTOX STABILITE • ZEOGEL • TESTING EQUIPMENT BAROID WELL LOGGING SERVICE.

PATENT LICENSES unrestricted as to sources of supply of materials, but on royalty bases, will be granted to responsible all companies and others desiring to practice the subject matter of any and/or all of United States Patents Numbers 1 807-082; 1,991.637; 2,041,086; 2,044,758; 2,064,936; 2,094,316; 2,119,829; 2,214-366; 2,294,877; 2,304,256; 2,387,694; 2,393,165 and further improvements thereof. Applications for Licenses should be made to the Los Angeles office.

Baroid

SALES DIVISION

NATIONAL LEAD COMPANY

BAROID SALES OFFICES: LOS ANGELES 12 • TULSA 3 • HOUSTON 2

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FLOATING ROOF

IMPROVED

A GENERAL AMERICAN-
WIGGINS VAPOR SEAL

The result of 50 years' experience *building* tanks, plus 20 years *designing* vapor seals.

The Wiggins Hidek Floating Roof includes these *exclusive* features:

1. **A double vapor seal that cuts evaporation loss to a negligible fraction.**
2. **A deck sloped for efficient drainage, possible only with a Wiggins roof.**
3. **Roomy pontoons for easy inspection and maintenance.**
4. **Maximum in floatability with a minimum of steel.**

Save the "cream" of your product. Stop costly evaporation losses with a Hidek. For more complete details on the Wiggins Hidek Floating Roof, write General American Transportation Corporation, 135 South La Salle Street, Chicago, Ill.

General American Transportation Corporation

maintains offices in: **Chicago, New York, Washington, Cleveland, Buffalo, Pittsburgh, St. Louis, New Orleans, Tulsa, Dallas, Houston, Seattle and Los Angeles.**

As a matter of Public Interest

...SOME HIGHLIGHTS FROM THE ANNUAL REPORT OF STANDARD OIL (N. J.)

Because Standard Oil Company (New Jersey) with its affiliated companies is one of the nation's large enterprises, its operations may be of interest not only to shareholders and employees, but to others as well. The following facts, selected from the Company's Annual Report, just published, provide a good summary of the Report and cover the developments of greatest public interest.

Eugene Holman Frank W. Abrams

EUGENE HOLMAN
PRESIDENT

FRANK W. ABRAMS
CHAIRMAN OF THE BOARD

End of War During World War II Jersey and its affiliates were called upon to a greater extent than any other company to fuel the armed forces of the country. They were the largest producers of 100 octane gasoline in the world. They produced, in Government-owned plants which they operated, as much synthetic toluene (for TNT) as all the rest of the world combined. They were among the largest producers of the raw materials of synthetic rubber.

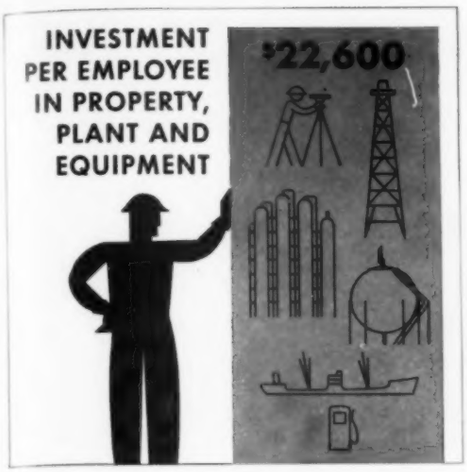
Reconversion Reconversion was carried out smoothly and quickly. It was possible, with relatively few difficulties, to change over from an intricate pattern of manufacture and transportation designed for a nation at war to an equally complex pattern fitted to a nation at peace, and to begin supplying, upon short notice, civilian demand for unrationed gasoline and many other products.

Oil Production World-wide production of crude oil by consolidated companies was 995,000 barrels per day, an increase of 8 percent over 1944. During 1945 the domestic crude production of Jersey affiliates represented 9 percent of the oil produced in the United States, and their world-wide production amounted to 13.5 percent of the oil produced throughout the world.

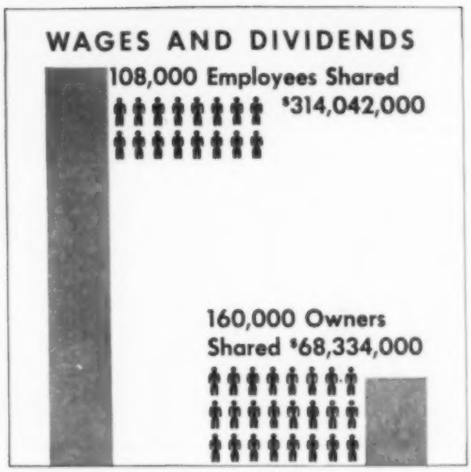
Refining The amount of crude oil processed in the domestic and foreign refineries of affiliated companies—1,119,900 barrels per day—represented an increase of 5 percent over 1944. Crude run to domestic refineries was 13 percent of the total crude processed in the United States.

Transportation From the outbreak of hostilities in 1939 until V-J Day, 96 tankers owned by Jersey and affiliated companies were lost, either through capture or seizure by the enemy, sinking, collision, or stranding. The lost vessels have been partially replaced, and plans are under way to add further to the fleet's carrying capacity.

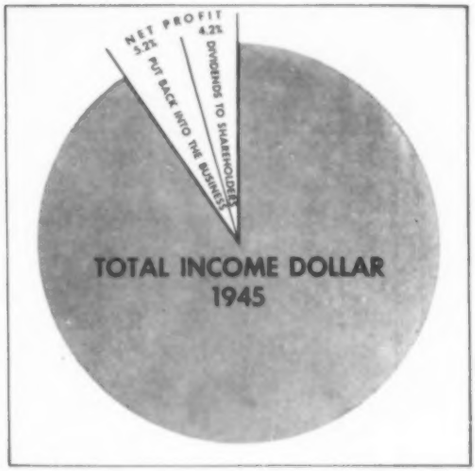
Marketing Everywhere, throughout the war, marketing activities were largely regulated by government



FOR EACH EMPLOYEE ON THE PAYROLL Jersey and its consolidated companies have invested $22,600 in property, plant, and equipment. The gross value of capital investments in lands, refineries, pipe lines, tankers and other properties necessary to provide 108,000 jobs was $2,441,942,488 at the end of 1945.



EACH FIGURE REPRESENTS 6,750 PERSONS, and the bars represent the amounts of income each group received from Jersey in 1945. The sum of $314,042,000 was paid to employees of the Company and affiliates in wages, salaries and benefits. Dividends amounted to $68,334,000.



THIS SHOWS THE PROPORTION OF NET PROFIT made by Jersey and affiliates out of total income in 1945. It shows also the proportion paid to shareholders in dividends and that left in the business to meet future capital expenditures, etc. All the rest of the income was required to pay wages, purchase materials and meet other operating costs.

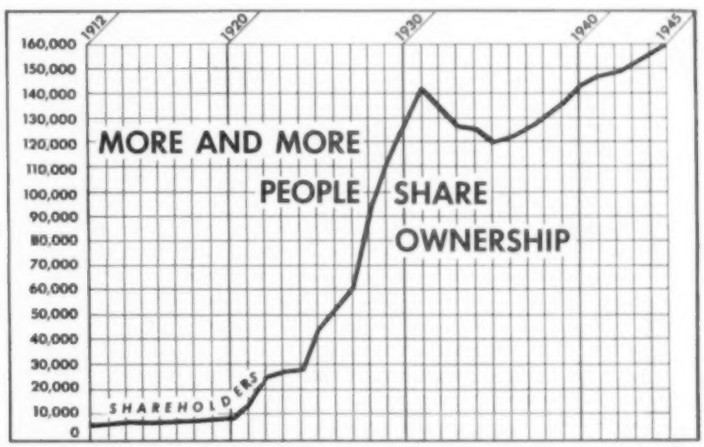
directives, and when these were ended in the United States and in some foreign areas there was a rapid return to normal competitive activity. World-wide sales of refined products in 1945 were at the rate of 1,193,000 barrels per day, an increase of 4 percent over 1944. Of this amount 694,000 barrels per day were sold in the United States domestic market.

Research Until the end of hostilities Jersey research was almost entirely on war work of highest importance. Immediate postwar research budgets will be approximately 50 percent above prewar budgets as part of a program to carry over into a peace-time world research begun for war, and to continue scientific inquiries on petroleum as a raw material for many products.

Employee Relations Jersey and affiliates continued to enjoy excellent labor-management relations. When the war ended, Jersey's domestic petroleum affiliates proposed upward adjustment in wages and salaries of 15 percent. This was accepted by all employee bargaining agencies involved. By March 1, 1946, an additional 3 percent had been negotiated and accepted. One of the best evidences of the satisfactory employee relationships in Jersey is the fact that 95 percent of the domestic employees who have been released from the armed forces have returned to the Company.

More than 79 percent of eligible domestic employees are now buying term life insurance under the Group Insurance Program for a total coverage of $160,241,800.

Employees participating in the Thrift Plan contributed last year $15,019,011, which was supplemented by Company contributions of $18,921,235.



WIDENING OWNERSHIP OF JERSEY is shown by the fact that the number of shareholder accounts has increased from 5,816 in 1912 to 160,025 as of December 31, 1945.

Earnings Consolidated net earnings in 1945 amounted to $154,156,196, equivalent to $5.64 per share. For 1944 the consolidated net earnings were equivalent to $5.69 per share. During the year the Company paid dividends totaling $2.50 per share.

Statement of Principles In order to make as clear as possible the Company's outlook in today's changing world, the Board of Directors has prefaced this year's Annual Report with a special *Statement of Principles*. This expresses, for our stockholders and for anyone else interested, basic viewpoints and policies of the Company.

[*Copies of the full report are available on request. Address Room 1626, 30 Rockefeller Plaza, New York 20, N.Y.*]

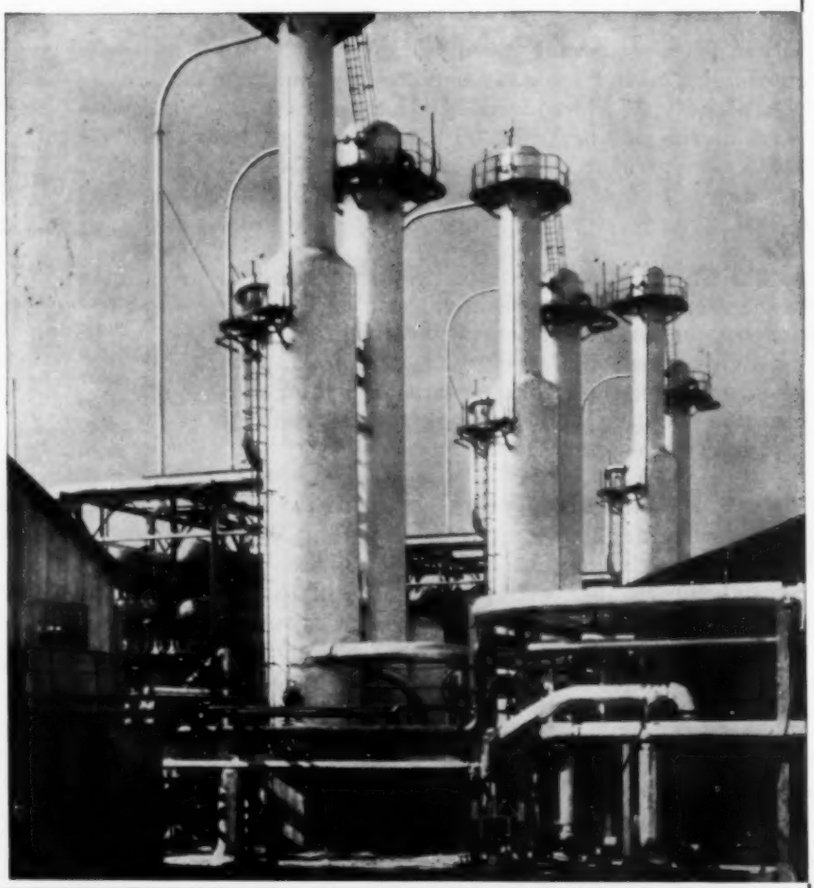
STANDARD OIL COMPANY (NEW JERSEY)

AND AFFILIATED COMPANIES

NEWALLS

85% Magnesia Insulation

IS EXTENSIVELY USED ON THE CLASS OF WORK ILLUSTRATED. IT HAS AN EXTREMELY LOW THERMAL CONDUCTIVITY, IS LIGHT IN WEIGHT AND WILL MAINTAIN ITS EFFICIENCY THROUGHOUT THE LIFE OF THE PLANT. BEING EASY TO APPLY, ALSO INEXPENSIVE, IT IS IN ALL RESPECTS AN IDEAL COVERING FOR BOILERS, PIPES, HEAT EXCHANGERS, ETC. WRITE FOR OUR CATALOGUE "HEAT INSULATION" WHICH DESCRIBES ALL OUR HEAT INSULATING MATERIALS.



NEWALLS REG'D BRAND PRODUCTS

NEWALLS INSULATION CO. LTD.

WASHINGTON STATION
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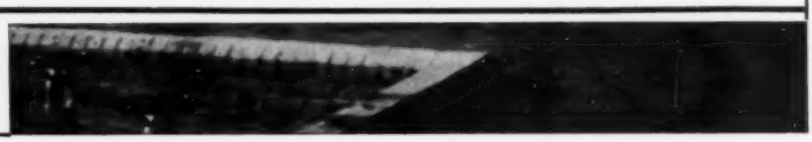

You cannot write a specification that will assure you of getting the *plus values* that are automatically built into the structure when you come to Chicago Bridge & Iron Company for steel plate work. Each job is handled by skilled, qualified workmen under rigid inspection. And, while there are numerous prescribed standards governing the fabrication of various types of work, there is only one Chicago Bridge & Iron Company standard of workmanship—the BEST!

• *The pressure vessel shown above is an 11-ft. diam. by 84-ft. bubble tower fabricated at our Birmingham, Alabama plant for an Oklahoma refinery.*

builders of

depropanizer towers ○ debutanizer columns ○ regenerator towers ○ stabilizer columns refinery drums ○ pressure cylinders ○ retorts ○ vacuum stills ○ cracking chambers catalytic towers . . . and vessels to meet all kinds of engineering specifications

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Plants in Birmingham, Chicago and Greenville, Pa. **Export Office — 165 Broadway Building, New York 6, N. Y.**

En Argentina—Leopoldo Sol & Cia., Reconquista 558, Buenos Aires
En Cuba—Edificio Abreu, 402, La Habana
En Venezuela—Chicago Bridge & Iron Company, Ltd., Caracas, D. F., Apartado 1348
En el Canada—Horton Steel Works, Limited, Fort Eric, Ontario

Design by Victor Reinzanum

MOSAICS OF STEEL

NUMBER ONE

Cast iron as an engineering material has found fresh favour with the advent of high duty irons. The materials, in strength, soundness and physical properties, are a great improvement on the best cast iron of a generation ago. Workington irons enjoy unusual confidence amongst foundry men, particularly for special duties. The unique conditions existing at Workington contribute to the production of superior irons. The pure hematite ores are mined locally and, with rigid control throughout all processes, result in a product having a low sulphur and phosphorus content. All iron manufactured is machine cast and is free from sand and awkward pieces. Refined irons are also made from virgin metal without remelting or the addition of scrap. They are therefore eminently suitable for the production of malleable iron and special castings. Workington pig iron is used as the basis of the finest acid steels.

THE UNITED STEEL COMPANIES LTD

THE UNITED STEEL COMPANIES LIMITED

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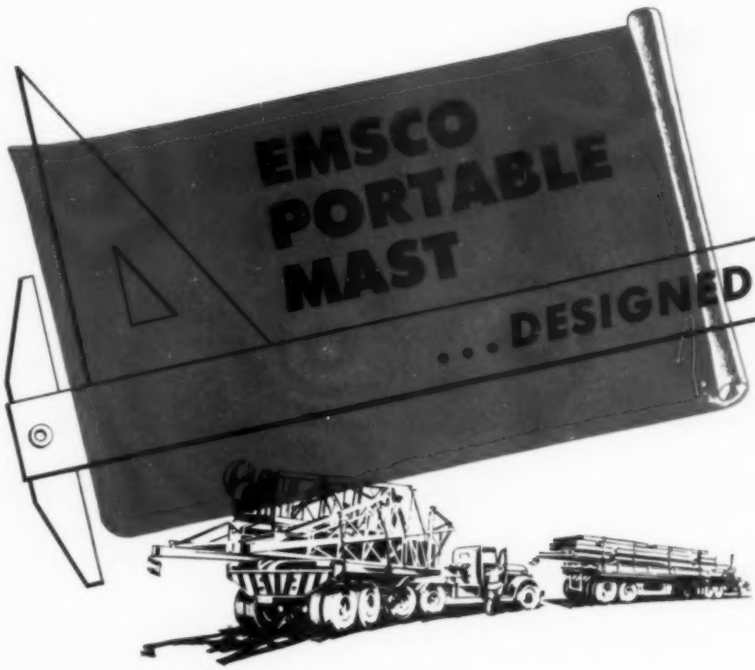
STEEL, PEECH & TOZER, SHEFFIELD
SAMUEL FOX & CO. LTD., SHEFFIELD
UNITED STRIP & BAR MILLS, SHEFFIELD

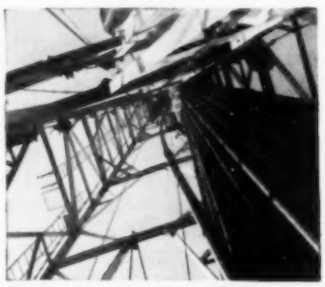
APPLEBY-FRODINGHAM STEEL CO. LTD., SCUNTHORPE
WORKINGTON IRON & STEEL CO., WORKINGTON
UNITED COKE & CHEMICALS CO. LTD., CUMBERLAND

THE ROTHERVALE COLLIERIES, TREETON
THE SHEFFIELD COAL CO. LTD., TREETON
THOS. BUTLIN & CO., WELLINGBOROUGH

USP. 45

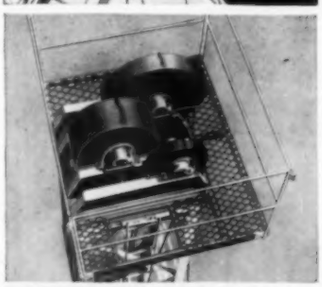


EMSCO bulge-type Portable Masts are designed and engineered for mobility. Safety, however, has been stressed throughout the design to a point not found in most conventional portable mast designs.



NO INTERIOR BRACING GIVES CLEAR VIEW

Visibility from the driller's position is clear and unobstructed. Emsco's bulge-type design permits racking of the drill pipe inside the base and allows lacing of all four sides, and the elimination of interior bracing. The driller can see the derrick man and the derrick man has a clear view of the floor.



CROWN SAFETY PLATFORM

A crown safety platform, extending on three sides of the mast, provides safety while servicing the crown block. The floor is welded expanded metal with non-slip surface. Sheave guards, providing additional safety, are optional equipment.

WORKING PLATFORM

The working platform is of the split board type. This places the derrick man squarely in front of the setback with one foot on each board. Maximum ease of pipe and elevator handling result. Rigid racking fingers clamp separately to beam girts for adjustment in spacing and are hinged to permit folding against derrick face.

EMSCO DERRICK & EQUIPMENT COMPANY

HOUSTON, TEXAS LOS ANGELES, CALIFORNIA DALLAS, TEXAS

"PACEMAKERS IN OIL FIELD EQUIPMENT DESIGN"

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announces the appointment of . . .

United Oilwell Service, S.A.

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To prevent or stop lost circulation, add JELFLAKE or JELFOAM to drilling mud or cement slurry. These light, tough fragments plug formation pores—*seal off* "thief" formations!

JELFLAKE and JELFOAM mix thoroughly in mud or cement slurry—retain their original properties.

Get *both* from United Oilwell Service in Caracas—or from any Dowell station or distributor in the United States. Be prepared.

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Representante en Suramérica, América Central y las Antillas . . .

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Agregando JELFLAKE o JELFOAM, se evita o se suspende la pérdida de circulación de lodo o de mezela de cemento. Son dos productos químicos en forma de fragmentos duros que tapan los poros de la formación—*¡aislan* las formaciones "ladronas"!

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Not ancient but modern lineage –

yet most distinguished ancestry!

Transport today means Oil—which itself requires transport, especially road transport. In peace and in war alike, over the whole field of road transport of fuel, Butterfield-built Tankers have earned high honours. So that now there is no higher praise for a Road Tank than to say "Built by Butterfield."

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MILD STEEL OR ALUMINIUM

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Division of Rockwell Manufacturing Company

Main Offices: 400 North Lexington Ave., Pittsburgh 8, Pa.

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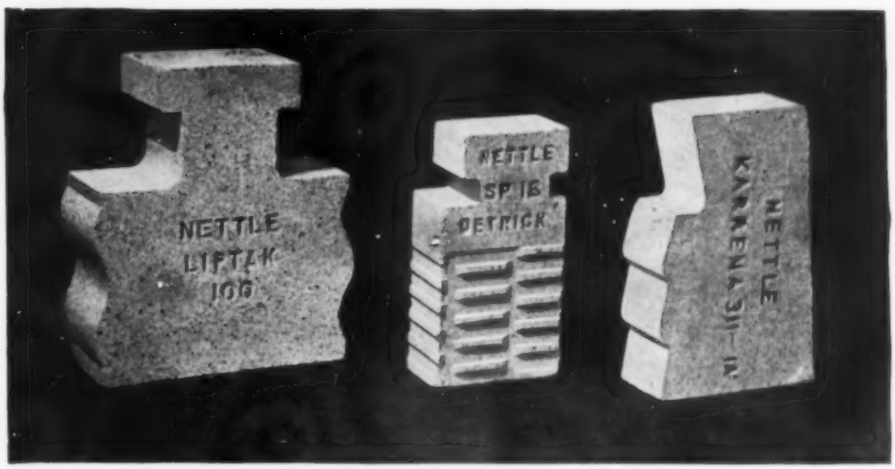
for OIL FIRED FURNACES



Out of a range of high grade refractories covering every industrial requirement the following brands are of particular interest to the Petroleum Industry and for Oil-Fired Furnaces in general.

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(35/37% Al_2O_3) Firebrick is a general purpose first quality firebrick which enjoys a wide reputation for regularity of quality.

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(42/44% Al_2O_3) is a super grade brick of exceptional uniformity manufactured under close control in a modern plant and fired in Tunnel Kilns. The brick to brick variation in quality and shape is reduced to the absolute minimum. Recommended for those parts of the liming where conditions are more severe.

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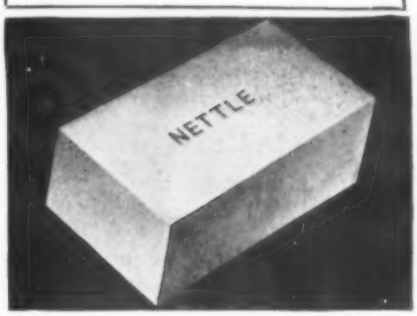
Standard crates 34" x 29" x 24" overall hold 100 - 9 x 4½ x 3" squares or 112 - 22".

Gross weight approx. 8½ cwts. each.



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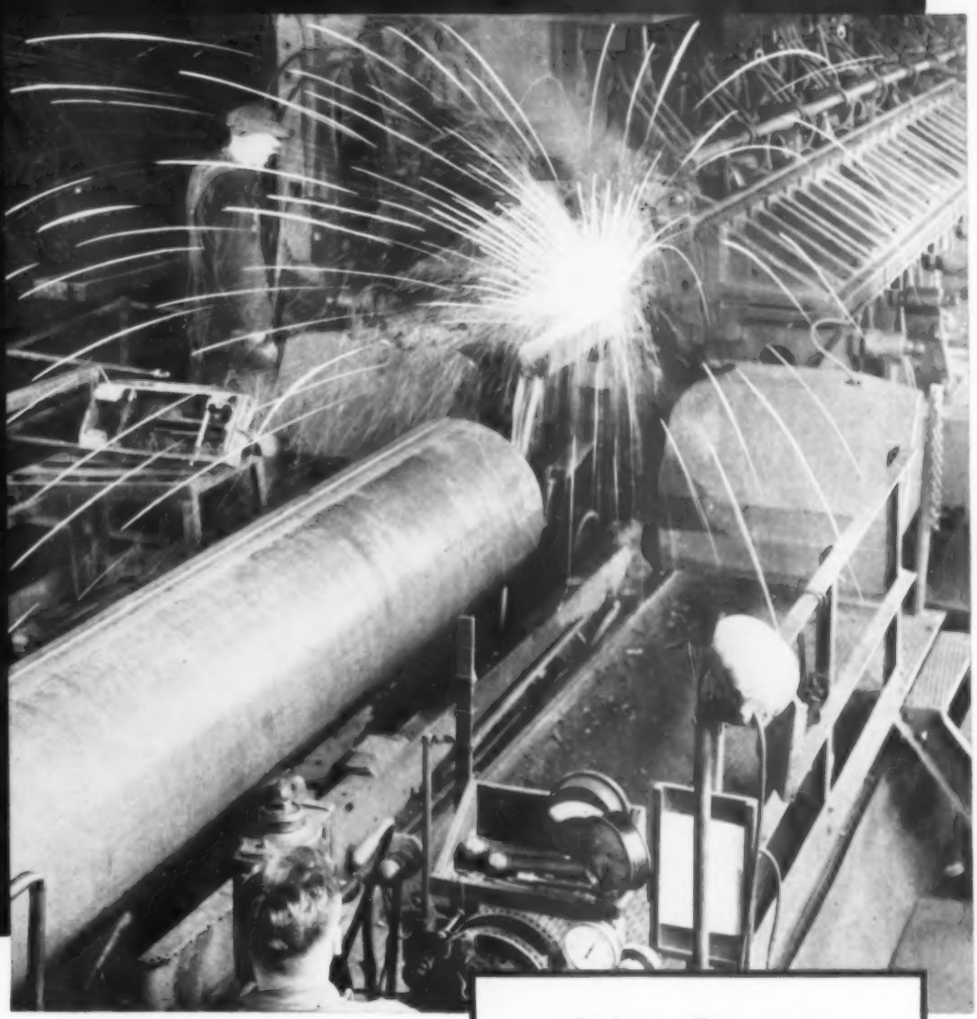
The Record Speaks for Itself:

SMITHway CASING, LINE PIPE



More than twenty thousand miles of SMITHway oil-well casing and large-diameter line pipe have been produced by A. O. Smith mills. Every major pipe line in the United States is either wholly or in part SMITHway.

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LINE PIPE

Established in 1874

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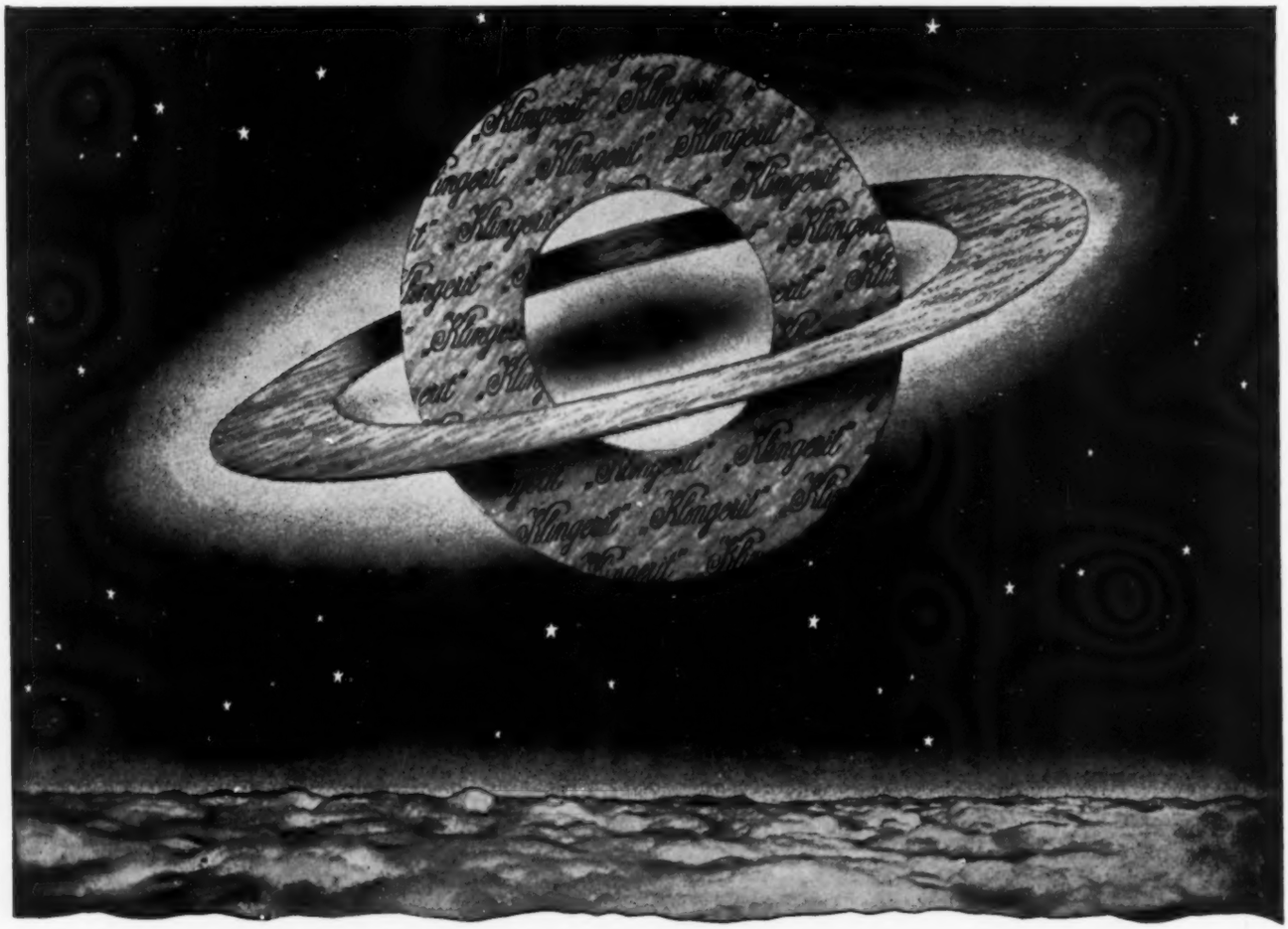

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KLINGERIT WORKS · SIDCUP · KENT · ENGLAND

the proposition **External equipment for adding or removing heat—or provision for its installation—should be included in any design for Fluid cat-crackers.**

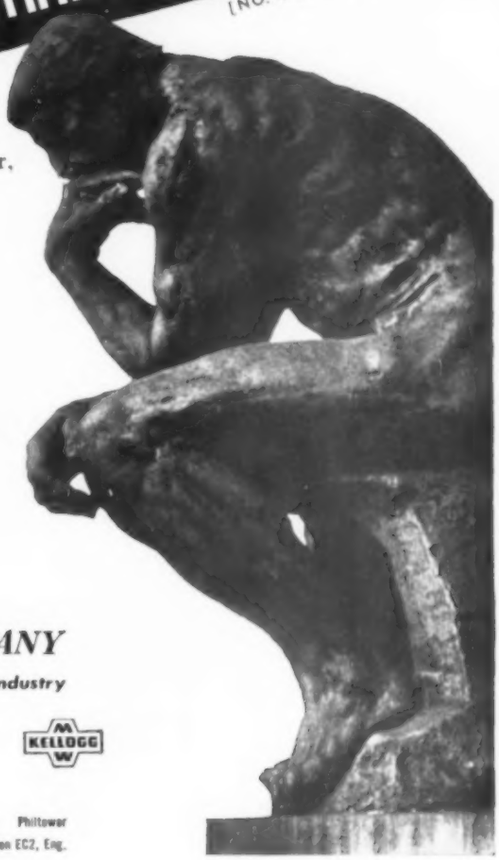
the facts It is thoroughly practical to design and build a heat-balance Fluid cat-cracker in which the heat formed in regeneration of the catalyst is sufficient to balance the heat required in the reaction phases. But such a unit, while sometimes more economical as to initial cost, can operate at top efficiency only on the originally planned feed.

In view of the probable variation in future charging stocks, and the certainty of changing requirements for quality of products, greater flexibility of any new unit becomes of paramount economic importance. To take full advantage of the flexibility which makes a Fluid cat-cracker so valuable in refining operations, every consideration should be given to the addition of a pre-heat furnace and, perhaps, a recycle catalyst cooler.

Such equipment need not be installed initially where heat-balance operations are currently predictable. However, where not installed initially, provision for future addition of such flexibility devices should be included in any design.

thinking it through

(NO. 4 OF A SERIES)



the conclusion **There is no substitute for the *best* design.**

THE M. W. KELLOGG COMPANY

Engineers and Economists to the Petroleum Refining Industry

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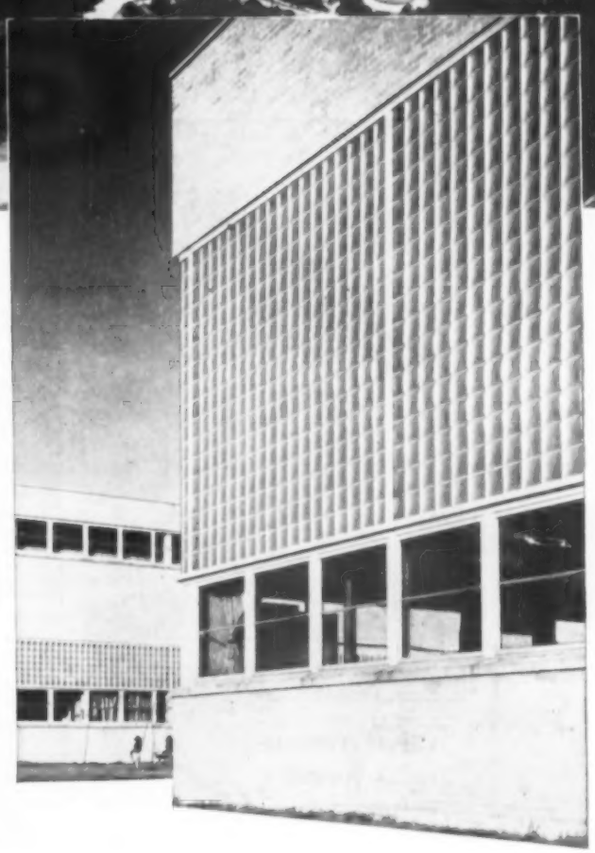
SINCLAIR

WHERE THE BOMBSIGHTS GREW



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Designed and built by Stone & Webster Engineering Corporation.

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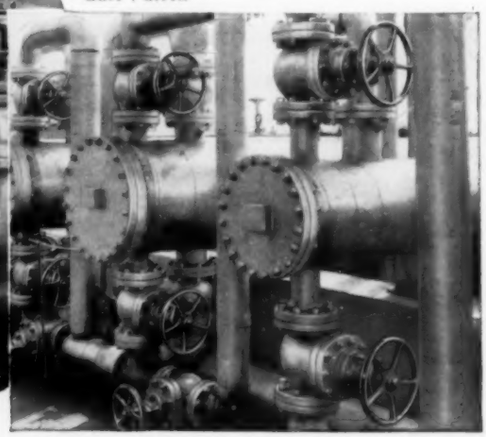
HEAT EXCHANGER BANK in a Recycling and Reprocessing Plant, showing Crane 250 lb. Ferrosteel Wedge Gate Valves.



CENTRAL MANIFOLD in Tank Farm Piping, equipped with Crane Fittings and Crane Standard Iron Body Double Disc Gate Valves.

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CRANE Supplies Them All

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Ask refinery men who depend on Crane service why they consider it so valuable. They'll tell you they can get *all* piping materials from *one* source. They appreciate the advantage of choosing from the world's greatest line of valves, fittings, pipe, fabricated piping and all accessories —in steel, brass and iron.

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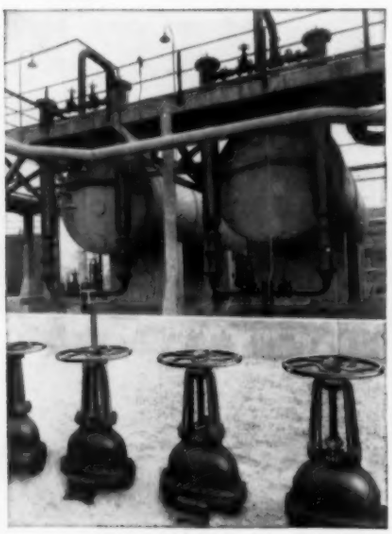
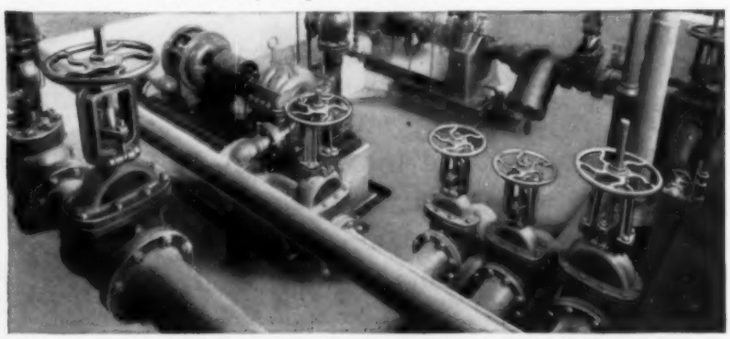


FURNACE OIL DISTILLATE TREATING PLANT. Featured are Crane Iron Body Wedge Gate Valves.



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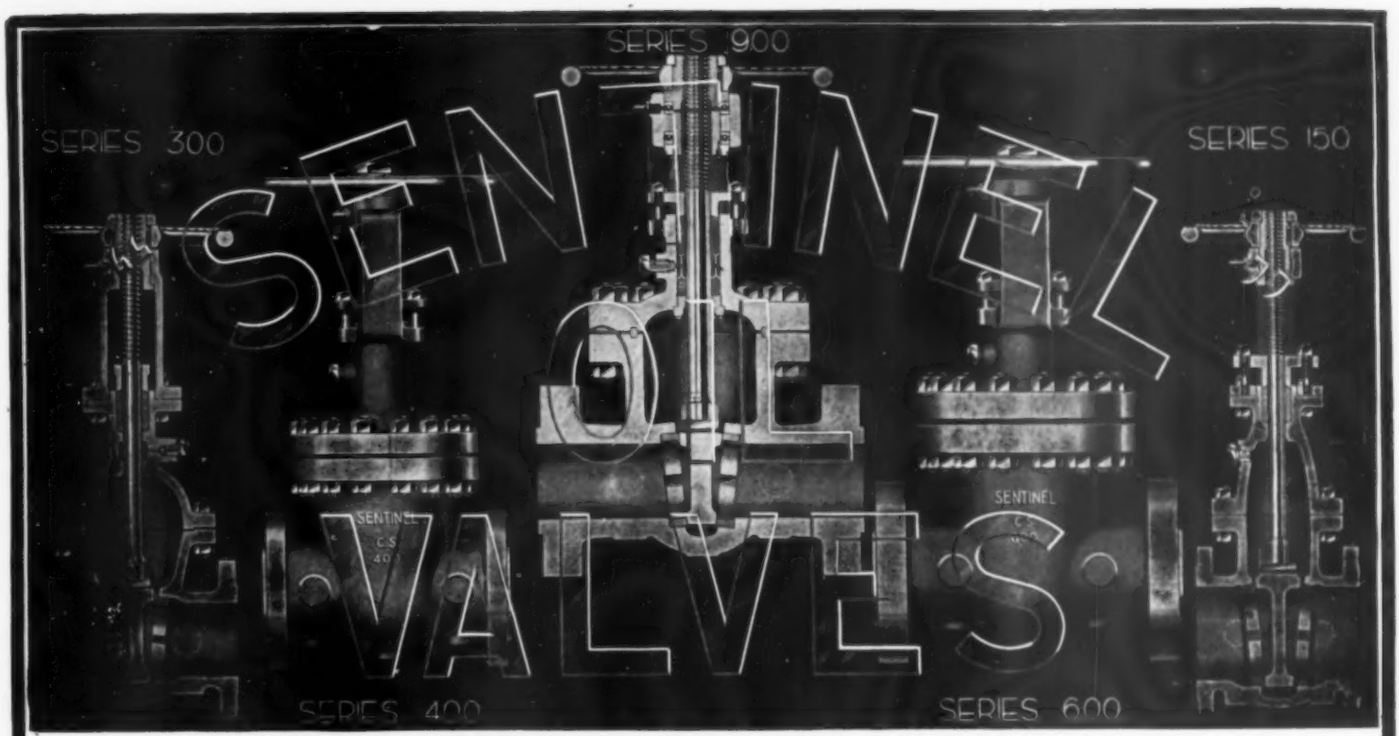

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Probolog in use inspecting tube bundle. Picture shows (A) probe puller withdrawing probe at constant rate, (B) recording instrument charting condition of tube.

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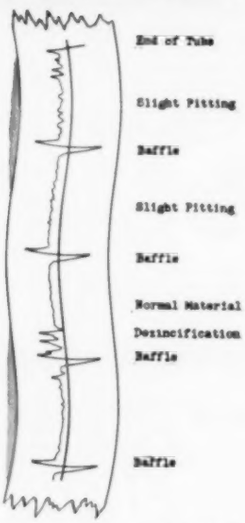

Actual chart made by Probolog showing defective isobutane condenser tube.

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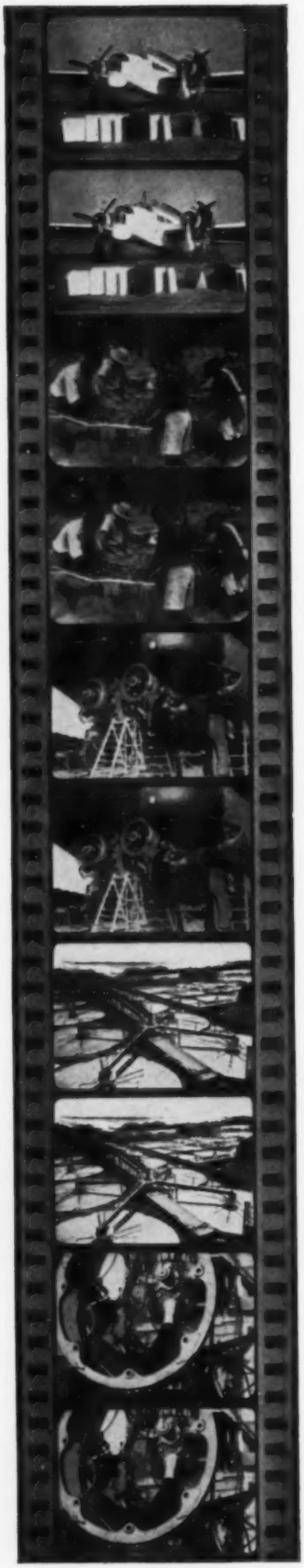

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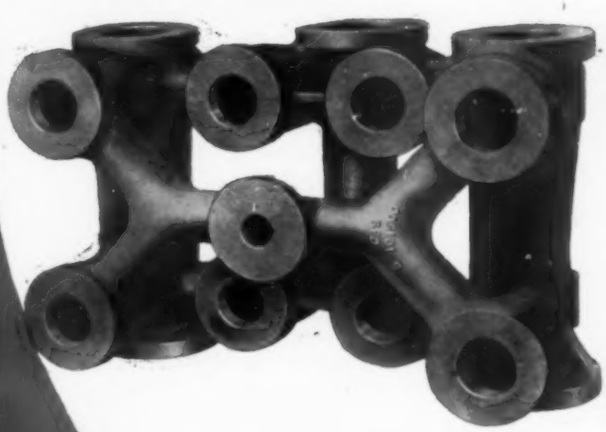

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Catalogs on request. State whether you are interested in Bronze and Iron; Cast Steel; or Valves to resist corrosion or handle high temperatures.

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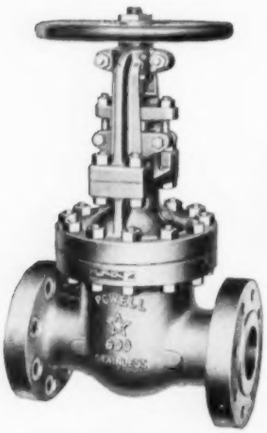
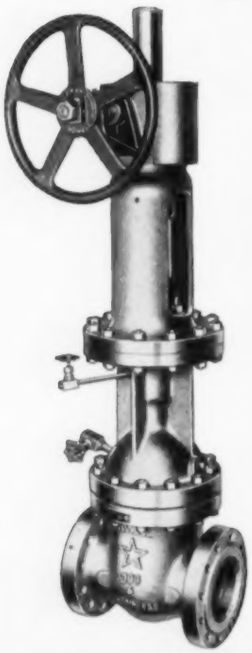
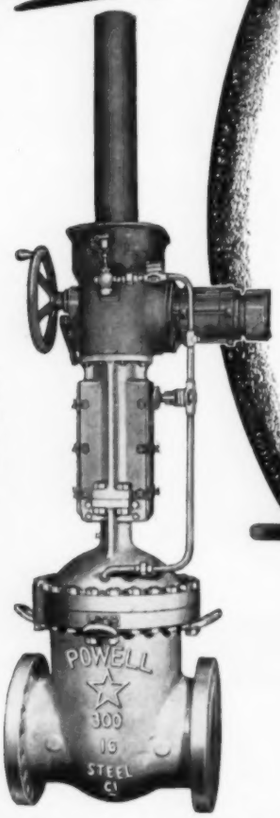


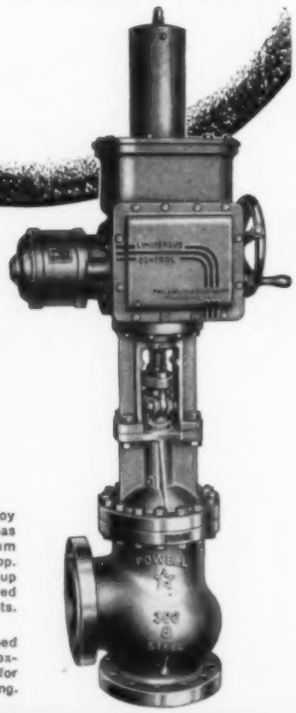




(Above) Class 300-pound Cast Alloy Steel Gate Valve. Designed for refineries producing 100 octain aviation gasoline. Has automatic steam sealing mechanism and top-mounted, fully enclosed, explosion proof electric motor operator for quick, positive opening and closing.

(Upper Left) Class 600-pound Stainless Steel O. S. & Y. Gate Valve. Specially adapted for extremely high (up to 1400F) or low (to - 300 F) temperatures.

(Lower Left) Class 300-pound Cast Alloy Steel Gate Valve. Designed to withstand the ultra high temperatures encountered in T. C. C. It has cooling fins to dissipate the heat, thereby reducing temperature in the stuffing box. Bevel gear operated. Spur gear operation, if desired.

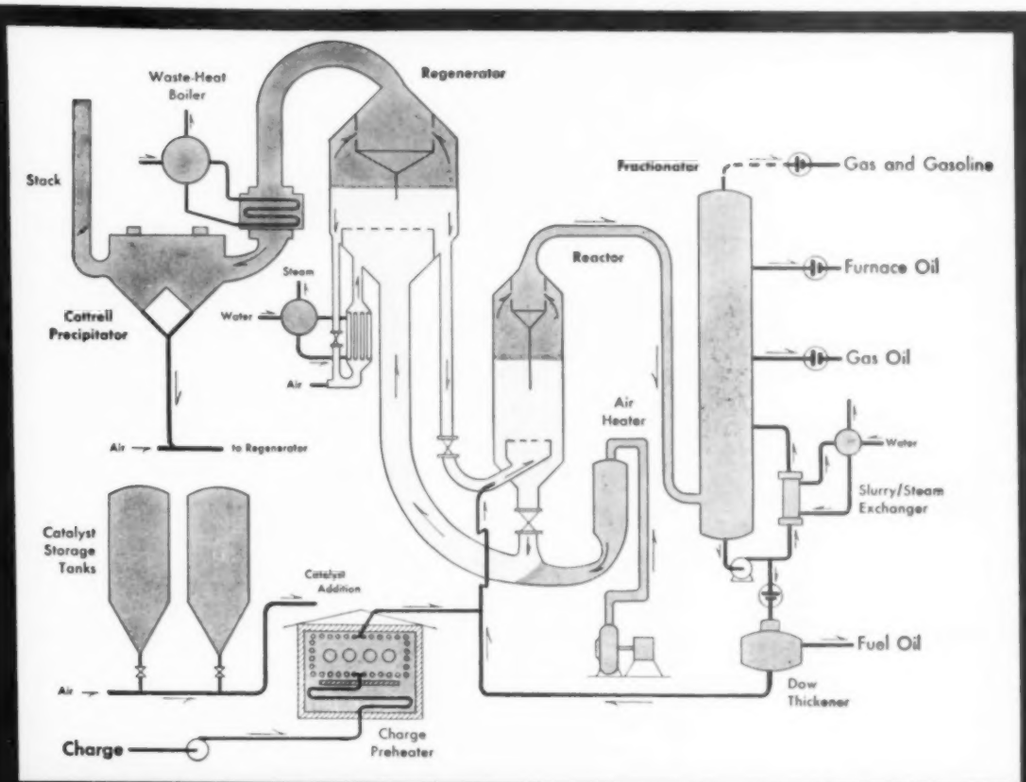


(Above) Class 300-pound Cast Alloy Steel Angle Valve. Streamlined areas through the body assure maximum flow with minimum pressure drop. Built to handle high temperatures (up to 1400F) such as are encountered in transfer lines in T. C. C. plants.

(Right) Same valve as above equipped with top-mounted, fully enclosed, explosion proof electric motor operator for quick, positive opening and closing.

POWELL VALVES

Flow Diagrams – 1946



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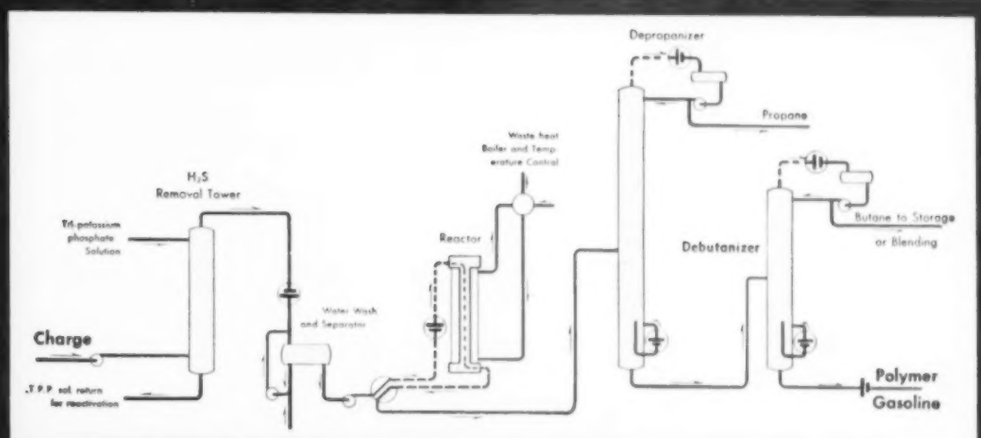


These flow diagrams are typical of those contained in Foster Wheeler's new 60-page Technical bulletin, titled "Petroleum Refining", available on request, address: Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y., or any branch office.

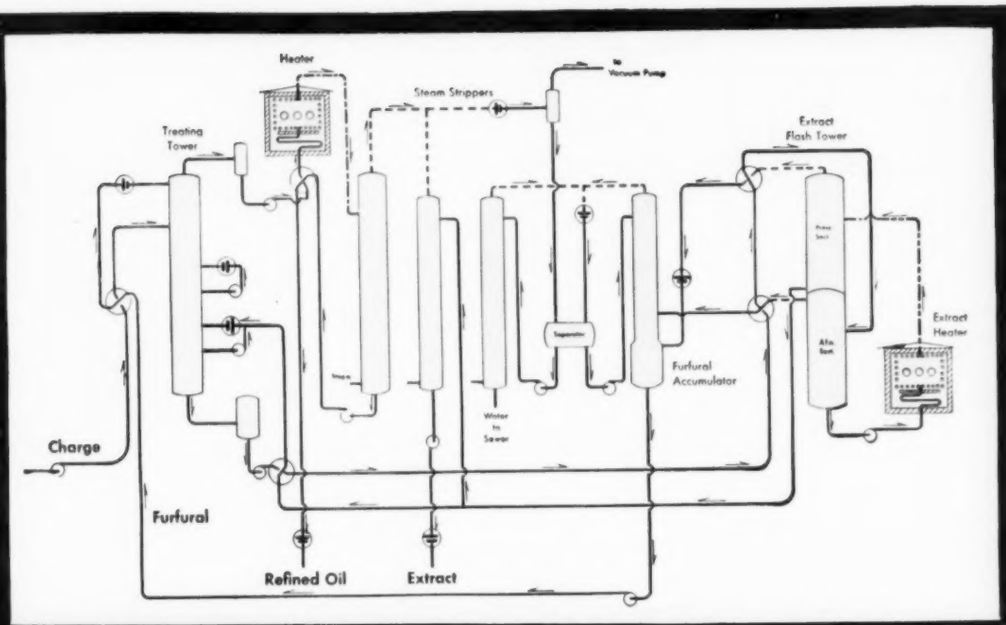
FOSTER WHEELER

Flow Diagrams – 1946

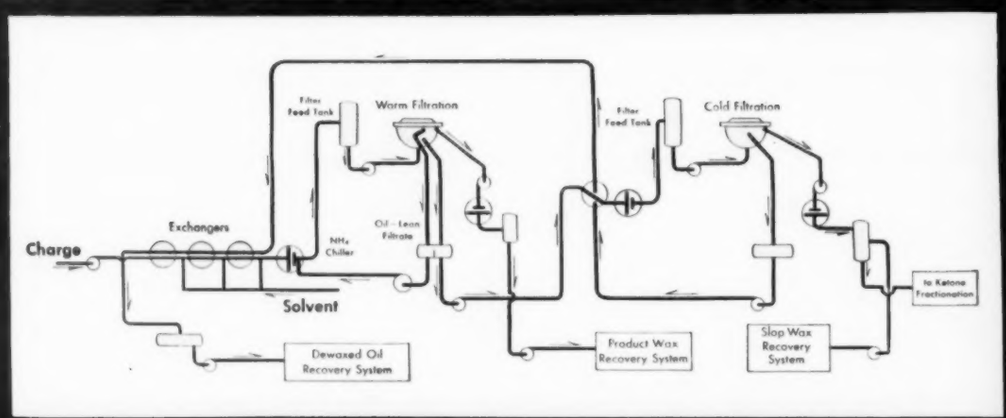
for

high V. I. Lube Oils

FURFURAL REFINING



Liquid —— Vapor - - - Cooler Condenser Heater Evaporator



for

Wax-free OIL and Oil-free WAX

"Reverse Sequence" SOLVENT DEWAXING

These flow diagrams are typical of those contained in Foster Wheeler's new 60-page Technical bulletin, titled "Petroleum Refining", available on request, address: Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y., or any branch office.

FOSTER WHEELER

WORLD PETROLEUM

PUBLISHED BY MONA PALMER

THE MANAGEMENT PUBLICATION OF THE INTERNATIONAL PETROLEUM INDUSTRY

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SUBSCRIPTIONS

Annual subscription $5.00 (U. S.) postpaid.
Single copies 50 cents.

GENERAL OFFICES

2 West 45th Street, New York 19, N. Y.
(Tel. MUrray Hill 2-7333)

BRANCH OFFICES

LONDON: Georgian House, St. James, London S. W. 1

CHICAGO 1: W. R. Cotton, Mid-West Advertising Manager, 307 No. Michigan Ave., *(Tel. Franklin 2508)*

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World Petroleum is published by Mona Palmer, Trustee under the will of Russell Palmer

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EDITORIAL

OIL DEMAND OVERCOMES INDUSTRIAL HANDICAPS

FOLLOWING the close of the war, industry prepared itself with amazing speed for the transition from production for military requirements to production for peacetime needs. Despite the abrupt closing of munitions plants and the rapid demobilization of the armed forces there was an actual increase in the number of workers employed. There was scarcely an indication of the lull in activity or of the deflationary movement that had been the cause of so much concern in official quarters. The prospect could scarcely have been brighter.

Since that time an epidemic of strikes has interrupted production and the maintenance of rigid and unnecessary price controls has delayed progress toward the full recovery for which industry had prepared itself so thoroughly. As a result shortages persist and in many commodities are more acute than during the period of hostilities. Domestic trade demands cannot be met; export orders which were relied upon to swell the tide of prosperity to the full are offered in quantity but cannot be accepted because manufacturers cannot obtain the needed materials. The opportunity to place America at the head of a world wide procession of prosperous business activity is being needlessly sacrificed.

In the face of this rather discouraging outlook it is remarkable that the demand for oil products has remained at an exceptionally high level and is exceeding the carefully considered estimates of experienced petroleum economists. Various authorities forecast required crude production in the United States in 1946 at from 3,850,000 to 4,100,000 barrels daily, approximately equaling the output in 1941 preceding American entry into the war. In reality daily production during the first quarter of this year was roundly 4,600,000 barrels or less than 200,000 barrels below the corresponding months of 1945 when military demands were approaching their height. At the same time imports were practically doubled, amounting to 400,000 barrels daily. Stocks inside the country increased only 8,000,000 barrels compared with 1945.

Striking a balance between these figures it appears that consumption during the first quarter of the current year was only about 2,000,000 barrels less than in the corresponding period of 1945. This is further confirmed by the fact that runs to stills during the first months of the year averaged something over 4,600,000 barrels daily or less than 200,000 barrels under the daily runs of the same months in 1945.

While stock of gasoline rose to a peak figure of more than 105,000,000 barrels in March of this year, a condition closely related to the inability of automobile manufacturers to turn out more than a fraction of the number of cars scheduled in their programs, the demand for other products, such as kerosene, middle distillates and residuals, led to imminent or actual shortages. Bunkering requirements of the Navy remained so much higher than earlier estimates that it was necessary to make an appeal to the regulatory authorities of Texas to increase crude production.

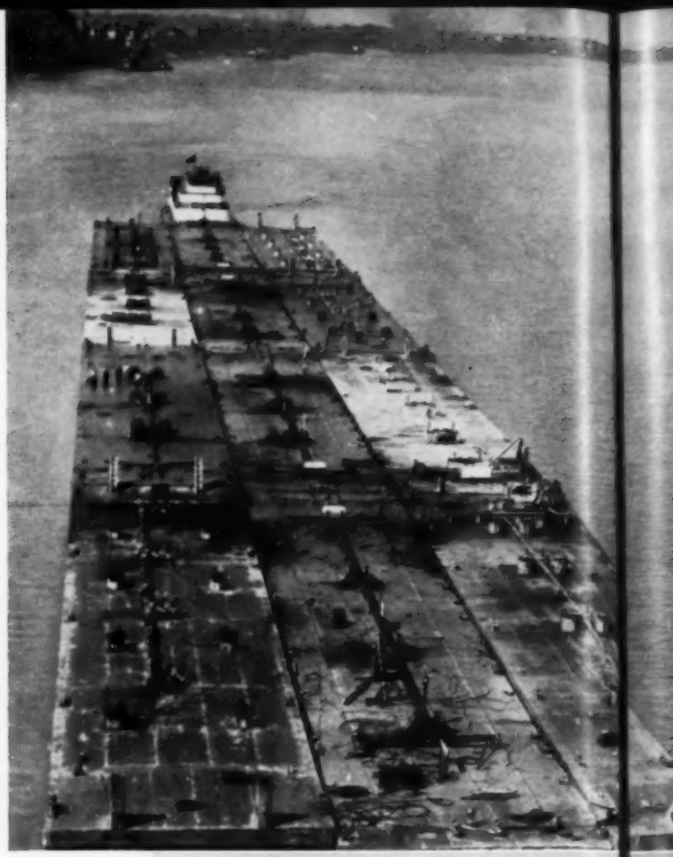
Export demand grew unexpectedly and foreign governments sent special commissions to the United States in an effort, only partially successful, to obtain products of which they were in urgent need. Even though prices were unremunerative the call for petroleum products kept output half a million barrels above anticipated daily production.

Assuming that the industrial chaos in which the country has been involved for the past several months will presently come to an end and that the normal course of business operation will be resumed there is very reason to believe that the demand for petroleum products will continue to accelerate.

Tremendous increases in demand are clearly ahead for middle and heavy distillates. According to accepted estimates ten million new homes are needed in the United States more quickly than materials and labor can be provided for their construction. If the wishes of their owners can be followed a large proportion of these will be equipped for heating by oil. Officials of the Oil Heat Institute predict that 2,500,000 domestic heating units will be installed within the next three years which will more than double the demand for this grade of fuel. The requirements for residual fuel present a problem which in the opinion of many students of the subject can be solved only by expanding imports of crude suited to the production of this kind of fuel.

There never has been any question of the rapid growth of oil consumption throughout the world once the disruption caused by war began to be mended. From present indications, however, this growth in demand is beginning earlier, is proceeding faster than was anticipated and has been able thus far to overcome many of the obstacles presented by political and industrial disturbances.

WORLD TANKER POSITION COMPLICATED BY HUGE U. S. WAR SURPLUS



IN the early years of the century the growth of tanker tonnage kept pace approximately with the expansion of international trade in petroleum products. In 1900 the total number of ocean going tankers (2000 gross tons and over) was 109 averaging about 5,000 deadweight tons and with an average speed of 9.03 knots. During the following decade the number and total capacity of ships was approximately doubled and between 1909 and 1914 another 50 percent was added. World War I, with its heavy demand for oil for military use, gave a strong impetus to tanker construction though many of the ships authorized were not completed until after the war's close. Between 1916 and 1921 520 oil carriers were added to the world fleet although the net increase was limited by the loss of some seventy-five during the height of the German U-boat campaign.

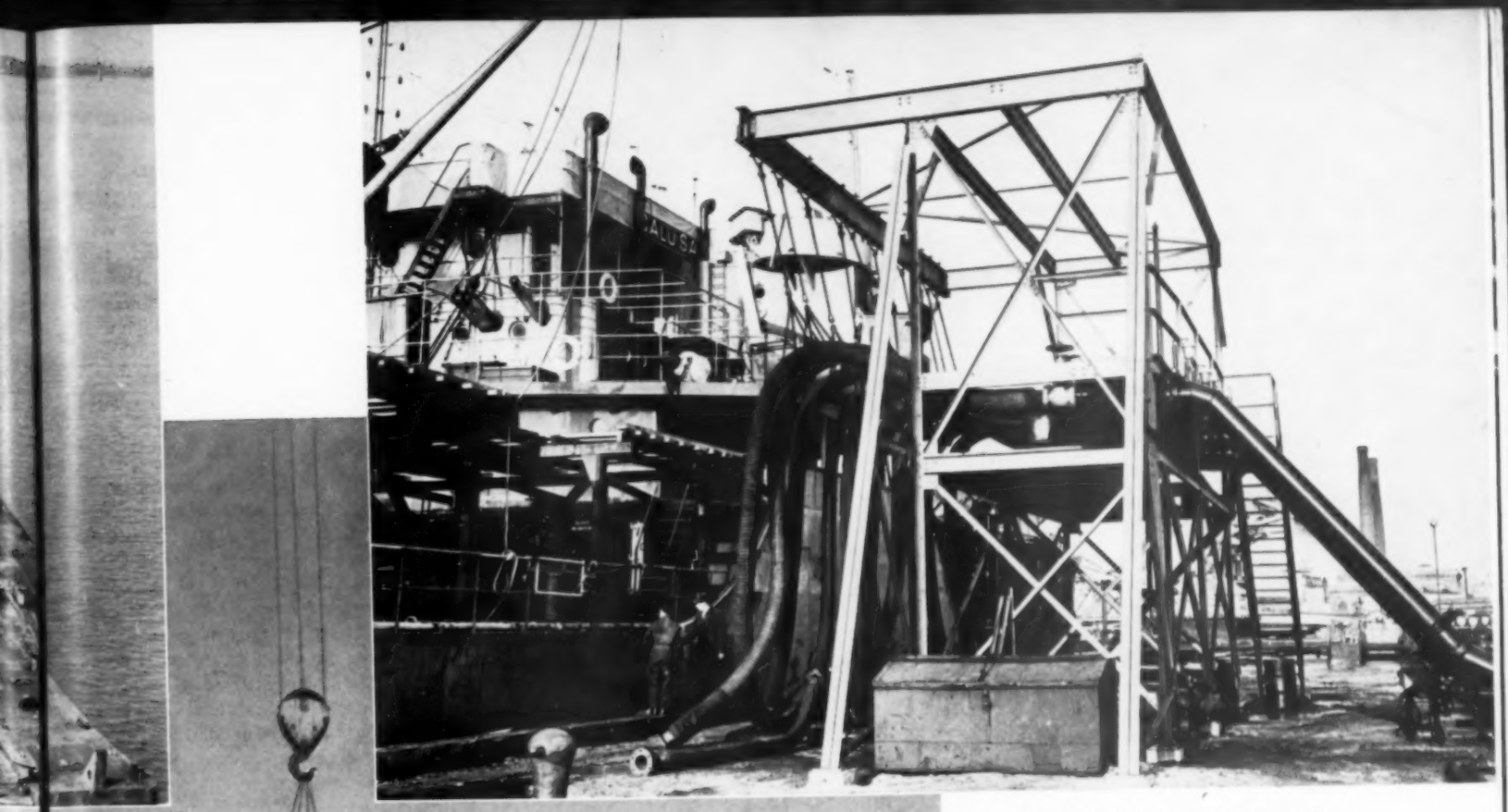
By 1929 the total number of tankers had grown to 1,147 and the total tonnage for the first time exceeded 10 million deadweight. Average speed has increased very slowly and had reached only 10.23 knots. Ships of moderate size and speed were still regarded as the most economical for oil transportation. In the following ten years numerous changes in construction and propulsion were introduced. Water tube boilers with pressure up to 650 pounds per square inch and superheated steam replaced the low pressure marine boilers previously in use. Diesel engines were adopted where formerly the reciprocating steam engine has been the prevailing type. Germany was expanding its shipbuilding activities and constructing tankers for its own use and for foreign oil companies, using Diesel power almost exclusively. Diesels became the accepted type for tanker propulsion in all European yards while in the United States they shared favor with the turbo-electric and geared turbine drives.

Greater size and speed also received more attention. Many of the German built ships were of 15,000 to 16,000 tons with speeds of 13 knots. Japan went even further and equipped itself with 18-knot vessels to move its oil over the long Pacific routes. Military authorities realized that with the universal substitution of liquid for solid fuel oilers capable of sustained speeds comparable to that of combat ships were a necessary adjunct of a modern navy and governments began extending financial assistance in the construction of such vessels. In 1937 the United States Navy, acting under authority conferred upon it by Congress, entered into a contract with Standard Oil Company (N.J.) to build twelve geared turbine tankers of 16,300 deadweight tons with a service speed of 16.5 knots. These ships were classed as part of the naval reserve and the government agreed to pay the cost of construction above that required for commercial use.

Another innovation during this period was the introduction of welding to replace riveted plates in hulls. The firist small welded ship was built in the United States in 1931 and the method was later applied to larger vessels. Its great advantage was demonstrated when the country was drawn into the second world cataclysm and faced the necessity of creating a tanker fleet of record size in record time.

At the start of World War II, in September 1939, the number of ocean going tanker units

Statistics quoted in this article are from the comprehensive report "Growth of World Tank Ship Fleets", compiled by Benedict Saurino, of Sun Oil Company.



Upper left: Twelve-Barge Crude Tow Operated by Standard Oil Co. of Ohio on the Ohio and Mississippi Rivers.

Above: Socony-Vacuum Reduced Turn-Around Time of Tankers at East Boston Docks with this Unloading Rack which Replaced Numerous Masts and Booms.

had reached a total of 1594. Their deadweight tonnage was 17,033,000 and their average speed 11.07 knots. In carrying capacity Great Britain ranked first, the United States second and Norway third. Seventy-two percent of all tanker tonnage was under the flags of these three nations. Another 19 percent was registered in Panama, Netherlands, Japan, Sweden and Germany, leaving only 11 percent among all other countries. The bulk of the international carrying trade, including virtually all free charters was in the hands of British and Scandinavian owners. While the United States was a close second to the United Kingdom in total tonnage the number of its ships was less by more than 100. Because of the higher cost of construction and operation of American ships under regulations imposed by the government United States tankers were unable to compete with European built vessels. Most of them were engaged in coastwise traffic from which foreign owned bottoms were excluded by law. A number of the larger oil companies, however, owned ships of foreign registry which they used for international shipments. A major part of the tank ships credited to Panama and Venezuela were so owned.

While the American flag tanker contingent included a number of thoroughly modern, relatively fast ships nearly two-fifths of the fleet consisted of slow-going vessels twenty years of age or over

Left: Reconversion to Peace. Removing Gun Platform from Socony-Vacuum Tanker.

which could still be used for transporting oil from port to port but were entirely unsuited for service with the battle squadrons. Moreover, the entire group of tankers was inadequate to move the enormous tonnages of oil products required to maintain the fleets and armies of the United Nations scattered around the globe. The government promptly requisitioned American flag tankers, placed orders for thousands of ships with existing builders and set up scores of new yards to produce the many types of craft required. To permit speed in construction and to simplify the provision of materials a standard type of tanker designated as T-2-SAE-1 was adopted and 481 of these ships were built for account of the Maritime Commission in 1942-45. The number of ocean going tankers built under the Commission's program during the war was 658 with a deadweight of 10,572,000 tons, the greatest bulk construction of this class of vessel ever carried out within a comparable period of time.

During the war years tanker construction was actively carried on in Great Britain and 162 ships were built between 1940 and the end of the war. The total number of tank ships completed in Allied and neutral countries was 937 of which 716 or more than three-fourths were built in the United States. Losses from enemy action and marine hazards were very heavy and cut deeply into tanker fleets, particularly those of Britain and Norway. The British lost 241 ships of 2,708,000 deadweight tons or nearly a million tons more than its new construction while 107 Norwegian ships aggregating 1,264,000 tons were sacrificed with no chance of replacements. Losses of the United States were 119 ships representing roundly 1,500,000 tons.

Above: High Seas Breaking Across Tanker's Waist. Left: Scanning a Calmer Sea. Photos Courtesy The Texaco Star.

At the close of the war, therefore, the world tanker situation presented a new picture such as never had existed before. Total deadweight tonnage has increased 44 percent since 1939 and now stands at 23,916,319 tons. Of this total 13,379,143 tons or well over 50% is under the American flag. Of the American fleet 646 ships of 9,727,924 tons are owned by the government, 208, of 2,923,675 tons belong to oil companies and the remaining 53 representing 727,544 are held by shipping companies or individual operators. The ships requisitioned for war service have been returned to their owners with the exception of those that were lost for which proper remuneration will be paid. The Navy presumably will want to retain some of the newer and faster boats in view of its enlarged field of operations but the number will be small in proportion to the total available. The government of the United States certainly does not want to engage in the business of oil transportation even if cargoes could be found to fill the tanks. It is impracticable to alter the vessels for other uses and American citizens cannot put them into international trade because of high operating costs.

About the only feasible way for dispersing the great fleet of oil carriers which saved the day for the Allies during the war but is entirely beyond the needs of peacetime requirements would seem to be by offering its more efficient components for sale, first to Americans and after that to foreign governments or their nationals, scrapping the fully obsolete vessels and retaining the remainder as a standby reserve until they too are fit only to be broken up for scrap metal. That in effect is the plan which Congress has authorized by an act adopted in March last. Under the terms laid down the government's shipping authority is directed to offer ships for sale under certain specific restrictions.

Under the terms of this law the Maritime Commission is authorized to offer for sale and to sell if a qualified purchaser is found "war built" vessels which are defined as those of 1500 tons or over constructed for the account of the United States between January 1, 1941 and September 2, 1945 or built between September 3, 1939 and September 2, 1945 and acquired by the United States during that period. Authority to make such sales, however, does not extend beyond December 31, 1947.

The Commission is directed to establish a national defense reserve of shipping. To this shall be assigned such vessels as it deems, after consultation with the Secretary of War and the Secretary of the Navy, should be retained for national defense. To these are to be added all vessels remaining unsold after December 31, 1947, except those determined by the Commission to be of such small value that the cost of their maintenance and preservation is not warranted. Once placed in the reserve ships cannot be used for commercial purposes unless requisitioned in accordance with provisions of the Merchant Marine act.

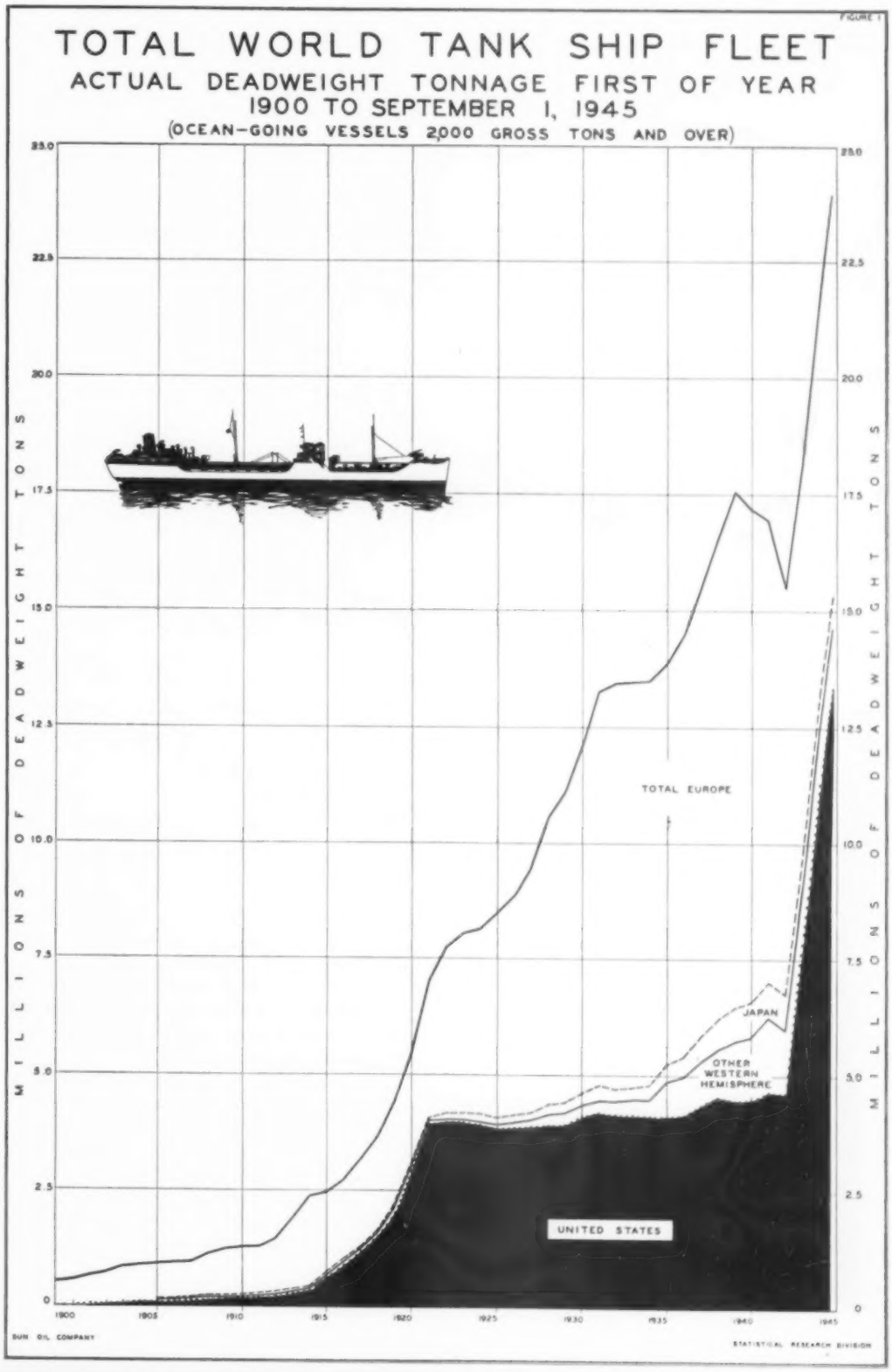
Within these limitations the Commission is authorized to dispose of vessels, giving first opportunity of purchase to American citizens. After vessels have been made available to such persons for "a reasonable time", which in the case of tankers is specified as ninety days, they may be sold to non-citizens if the Secretary of the Navy rules that they are not necessary to defense and the Commission agrees that they are not essential to the promotion of the Merchant Marine. Price restrictions are laid down by the act. While dry cargo ships may be sold at 50 percent of their pre-war cost of construction tankers are in a preferred class and must command a "statutory sales price" equal to 87½ percent of the pre-war cost of a vessel of the same type and size. Certain adjustments may be made including a depreciation charge of five percent per year for the period between the date of the ship's completion and the date of its sale and a further deduction of four percent for excessive wear and tear in war service. In no case, however, are the deductions to bring the sales price of a tanker below 50 percent of pre-war construction cost. The Commission is also authorized to accept other vessels in part exchange for those that it sells at a valuation to be fixed by it but the trade-in allowance cannot be more than 33 1/3 percent of the statutory price of the ship sold by the Commission in the case of ships of equal tonnage. Differences in tonnage are to be equalized on the basis of 33 1/3 percent of actual deadweight. One of the purposes of the exchange provisions is specifically stated to be the modernization and improvement of the American merchant marine. Congress also included in the act a specification that after the official termination of the war the commercial operation of vessels, either directly or through an agency, should continue only to the extent necessary to effect their orderly transfer to private operation.

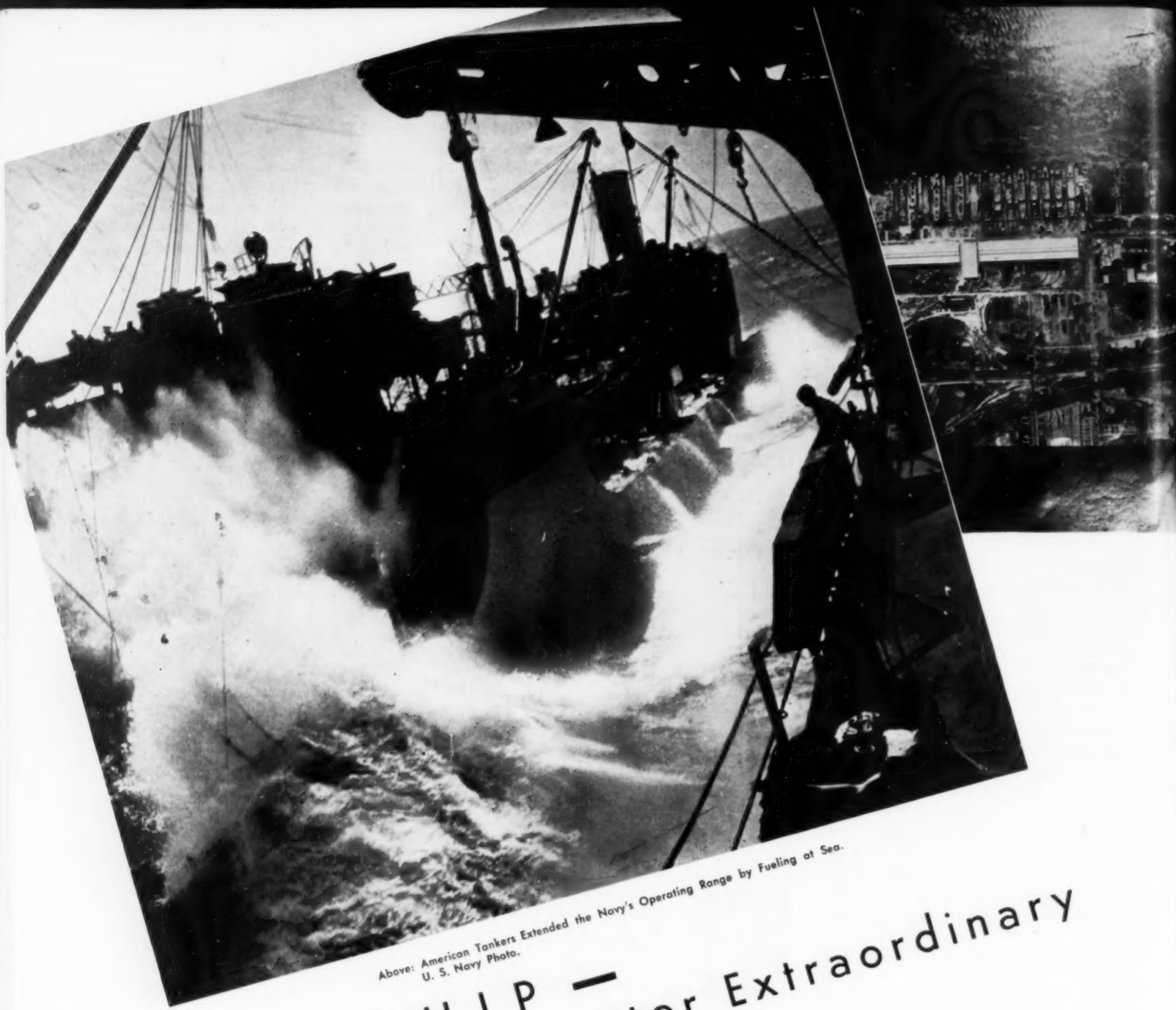
The law governing sales of surplus government owned vessels has not been in force long enough to provide a reliable forecast of the amount of tonnage likely to find purchasers. The act requires that ships available for sale be offered first to American buyers. Virtually all of the oil and shipping companies that operate tankers have submitted bids for vessels or have requested information as a basis for such offers. Acquisition of government owned ships, however, will not eliminate private construction. In several instances oil companies already have placed orders with builders for new ships preferring vessels built to their own specifications. A number of companies are taking advantage of the exchange provision of the law to retire ships that are more or less obsolete and to replace them with others of greater speed and capacity.

Hundreds of tentative offers have been received from foreign governments and shipping firms but as these have to await the results of prior negotiations with American citizens and as no vessels can be sold without official approval by the Navy it is impossible to form an accurate idea of the volume of outside sales.

According to the estimates of various Maritime experts the surplus tanker tonnage at the present time above current ocean transportation needs is on the order of 4,000,000 tons or perhaps 5,000,000 on the basis of pre-war carrying capacity. Estimated requirements of the United States in new tanker tonnage are placed at roundly 1,500,000 tons of the most modern ships while the rest of the world is calculated to have need of something like 3,000,000 tons.

FIGURE 1





Above: American Tankers Extended the Navy's Operating Range by Fueling at Sea.
U. S. Navy Photo.

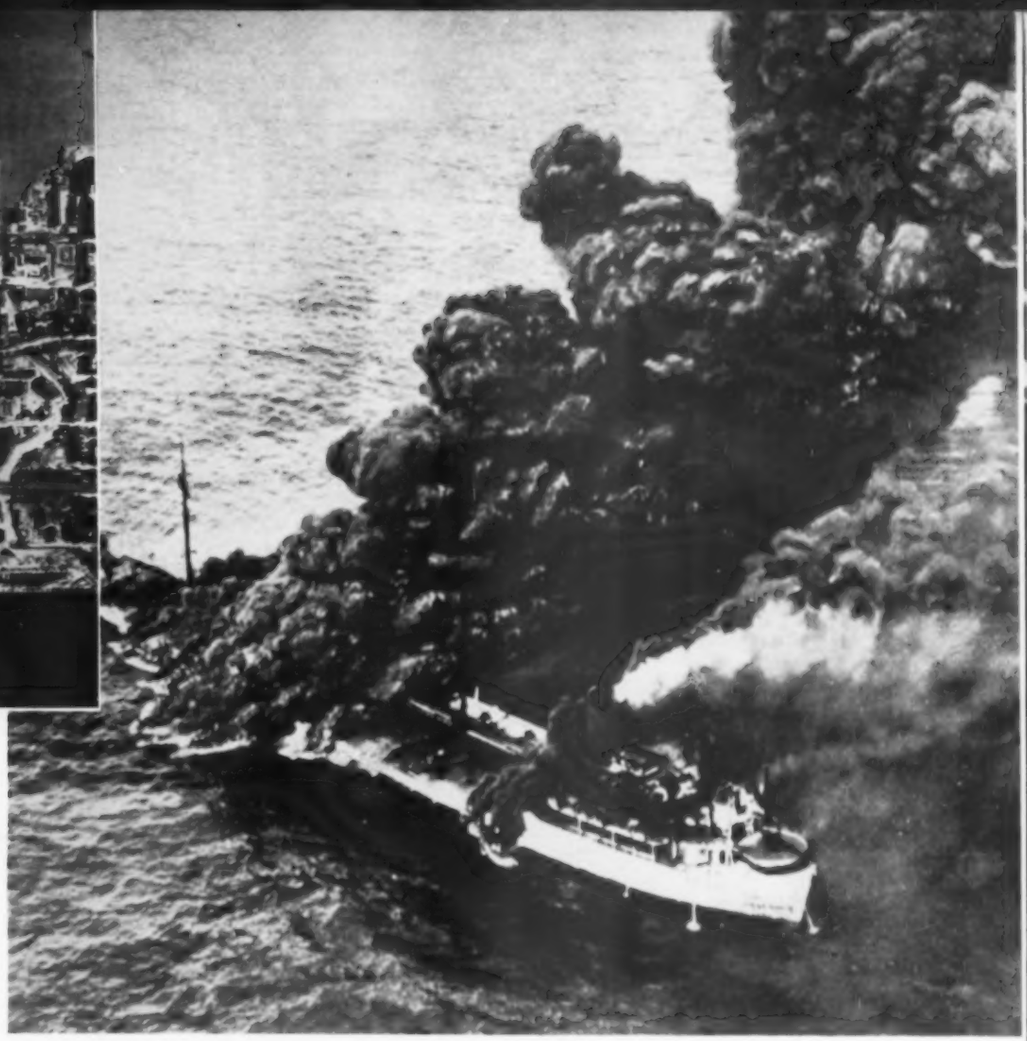
SUN SHIP — Tanker Constructor Extraordinary

Out of This Yard on the Delaware Came Hundreds of Ships During the War Years to Transport Millions of Barrels of Oil Products to Sustain the Fighting Forces of the United Nations Overseas.

AT the outbreak of war in Europe, in 1939, the United States had a tanker fleet of 383 vessels aggregating 4,434,000 deadweight tons and constituting 26 percent of the world's tanker capacity. More than a third of these ships were over twenty years old and their average speed was slightly over 10 knots. In 1945, when the war ended, the number of ocean going tankers under the American flag had risen to 907, the tonnage had increased to 13,379,000 tons and the average speed to 13.74 knots. Both in numbers and tonnage the fleet exceeded that of all other nations combined. On the basis of size and speed it was equivalent to a fourfold increase over the pre-war figure and represented 64 percent of the world's total carrying capacity.

These statistics of the growth in size of the American tanker fleet do not measure the full extent of the wartime job done in this division of the shipbuilding industry. Between 1940 and 1945 no less than 119 United States tankers aggregating a million and half tons were sunk by enemy action or lost from other causes. Dur-

Aerial View of Sun Shipyards at Chester, Pa.



Above: M. S. Pennsylvania Sun Torpedoed on Her Third Mission in 1942. The Crew Extinguished the Fires and Brought Her Safely to Port for Repairs.

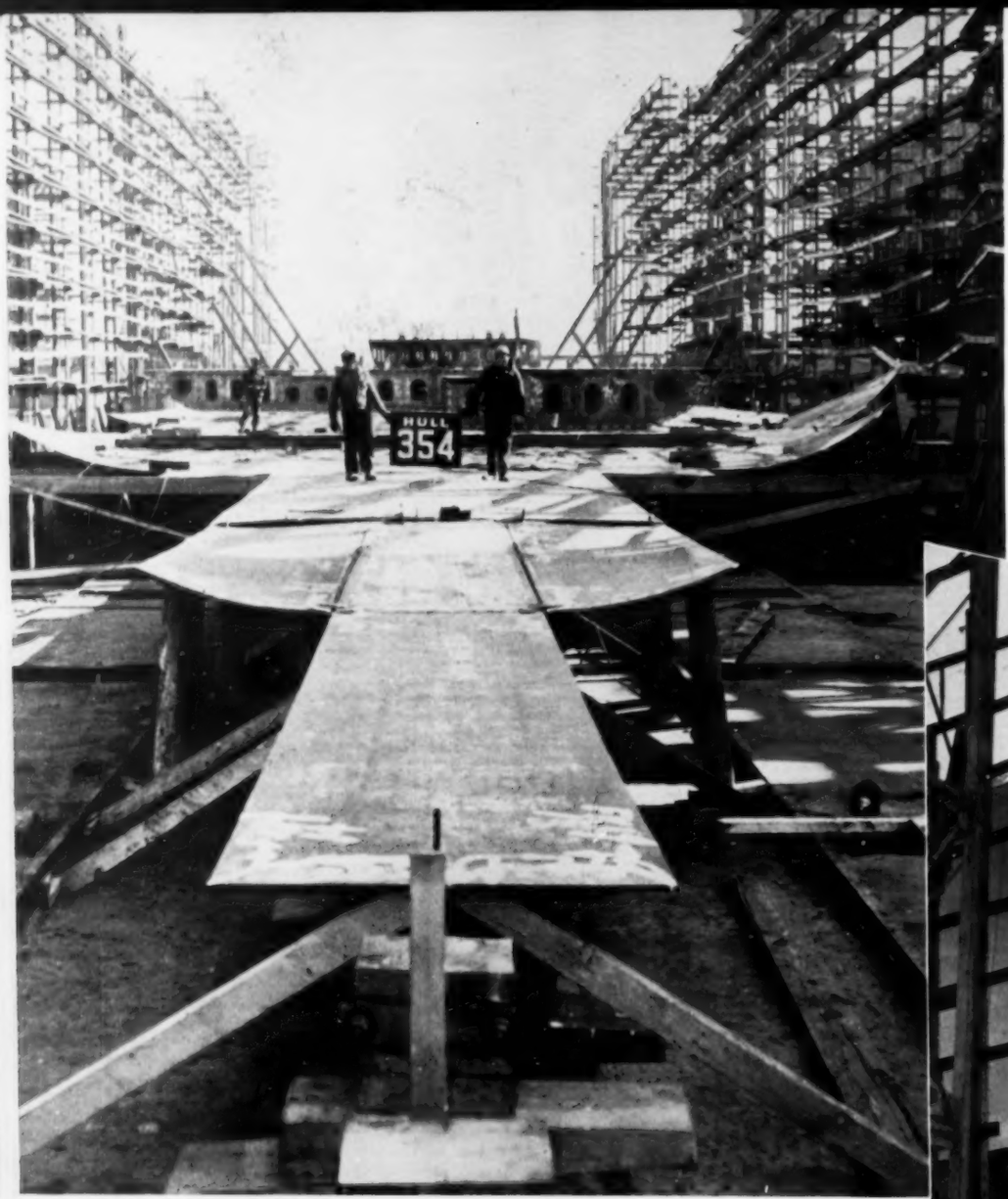
ing this five year period 716 new tankers, more than eleven million tons, were constructed, more than twice the tonnage built in the preceding forty years. Tankers of course constituted only a small part of the entire American shipbuilding program which produced nearly 55,000,000 tons of new bottom between 1939 and 1945. Because of the nature of the service they rendered, because this was a war of oil and also because the fighting men and planes and ships of the United States were scattered in every quarter of the globe and petroleum products formed 60 percent of the supplies that had to be transported to them, the building and maintenance of the world's greatest tanker fleet was a vital factor in the attainment of ultimate victory.

To a great extent the story of wartime tanker construction, as outstanding a triumph of mass production as any of the many achievements of American industry, is the story of a single yard, that of the Sun Shipbuilding and Drydock Company at Chester, Pennsylvania. Here was developed the type of ship adopted by the Maritime Commission as standard for the great bulk of its tanker tonnage and here was built 270 tankers in the five years 1941-1945 including 198 of the T-Z class.

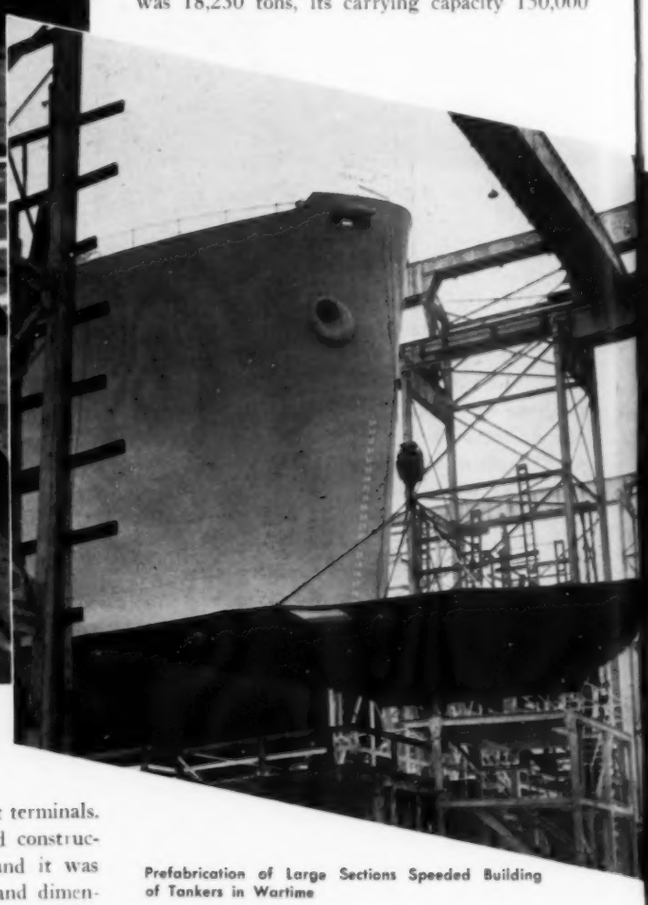
Sun Ship, with its present imposing series of shipways spread along the shore of the Delaware River at Chester and forming the largest shipbuilding yard in the world, had its modest beginning in 1916. It was founded primarily as an adjunct to the transportation department of Sun Oil Company and it got into action just in time to play a part in the shipbuilding activity of World War I. Though not classed as a "war yard" at that time, it supplied four cargo vessels of 11,500 deadweight tons for use in the war, four others of 12,130 tons which were later converted into troop transports and three mine sweepers. Significantly, however, the first ship to be launched from its ways on October 30, 1917, was the 10,600-ton tanker Chester Sun the keel for which had been laid before the United States entered the war. It had a carrying capacity of 75,000 barrels and was built for Sun Oil Company.

Sun Ship from its inception has been closely identified with the Pew family and has been one of the carefully fostered undertakings of that enterprising industrial group. Its first president was J. Howard Pew who together with his brother, Joseph N. Pew, Jr., founded the company. In 1918 J. Howard resigned to devote all his time to his duties as executive head of Sun Oil Company and Joseph N. became president of the shipyard. Under his administration the first tanker turned out by the infant yard was built. In 1919 J. N. Pew accepting the post of board chairman, gave place to a cousin, John G. Pew, whose activities up to that time had been largely confined to the natural gas industry. According to his own statement, John G. Pew never had been inside a shipyard until he took charge at Chester but, if so, he learned rapidly for the yard has risen to a place of outstanding importance during the 27 years of his administration and has been responsible for many innovations in ship construction and operation. For this Mr. Pew insists on giving chief credit to associates, some of whom have been with the company from its beginning. Among these are Robert Haig, senior vice president and Richard L. Burke, vice president and general manager. Others are John W. Hudson, chief naval architect and the members of the engineering and construction staffs. A more youthful vice president is John G. Pew, Jr. who came to the yard in 1932 on his graduation from college and has worked his way up through all the various shops and departments. As manager of personnel he is given much credit for his handling of labor relations during the troublesome period of the war and he is said to know personally more of the workers at Sun Ship than any other man there.

In the years following World War I the yard engaged in general ship construction. Its original five ways were increased to eight and two dry docks were added to provide facilities for repair work. In the score of years between the two world wars Sun built an increasing number of all types of ships, while tankers always figured importantly in its operations. Being a progressive organization it introduced many noteworthy advances in design, power and construction. It developed Diesel drives and the adoption of higher



Laying the Keel



Prefabrication of Large Sections Speeded Building of Tankers in Wartime

speeds and pioneered in such phases of shipbuilding as the sub-assembly method. Highly important as a preparation for the role it was to play later on in national defense it was first to adopt the all-welded method of construction. These first all-welded vessels, be it noted, were tankers. In 1931 the White Flash was built. It was a seagoing ship but of small size, 194 x 34 x 12 feet, of 887 deadweight tons. In 1934 a sister ship, the Franklin, followed. The success of these pioneer craft led in 1938 to the construction for the Atlantic Refining Company of the J. W. VanDyke. This was among the largest and speediest ships of its class built up to that time and attracted widespread interest in shipping circles because of the many new ideas embodied in it. Its dimensions were 521 x 70 x 40 feet and its deadweight tonnage was 18,100. Its turbo-electric drive developed 5,000 horsepower. Its designed service speed was 13.25 knots but it was easily capable of making 14 knots or better. Its capacity was 156,000 barrels and its cargo pumps, discharging 15,000 barrels per hour, enabled it to make a quick turnaround at terminals. The J. W. VanDyke was of welded construction except for the bow and stern and it was followed by others of similar design and dimensions such as the Robert H. Colley and the E. J. Henry which were welded throughout.

The changes which took place during the decade from 1930 to 1940, many of which were originated or had their first application in the yard at Chester, set the stage for a new era in tanker construction which was to have its most convincing demonstration when war again enveloped the world. They proved that larger and faster ships were economically practicable for the transportation of oil and brought about the adoption of many improvements in propulsion such as water-tube boilers with pressures of 425 to 650 pounds per square inch and superheated steam up to 900 degrees with high-powered turbo-electric, geared turbine or Diesel drivers substituted for old-fashioned Scotch boilers of 200 pound working pressures and slow speed reciprocating engines. Deadweight tonnages and cargo capacity were doubled and speeds stepped up from around 10 knots to 15 with some exceptionally fast ships of 18 to 20 knots.

Combination of the more salient advances made during this period led to the construction of one of the most famed ships produced at the Sun yard, the twin screw tanker S. S. "Cimarron" which gave its name to a class and served as the prototype of the standard tanker design adopted by the Maritime Commission for the huge production program of World War II. The Cimarron was 525 x 75 x 39 feet. Its deadweight was 18,230 tons, its carrying capacity 150,000 barrels and it has a sea speed of 19 knots. Four ships of the Cimarron class were built for private oil companies with government assistance prior to the war. Incidentally, Cimarron itself compiled a remarkable war record. It helped fuel the bombers that took part in Gen. Doolittle's raid over Tokyo, figured in the campaigns of Guam, Guadalcanal, the Marianas and the Philippines and was in Tokyo harbor at the time of Japan's surrender. Though attacked by submarines and bombed by enemy planes Cimarron never was damaged nor was one of her crew ever killed or wounded.

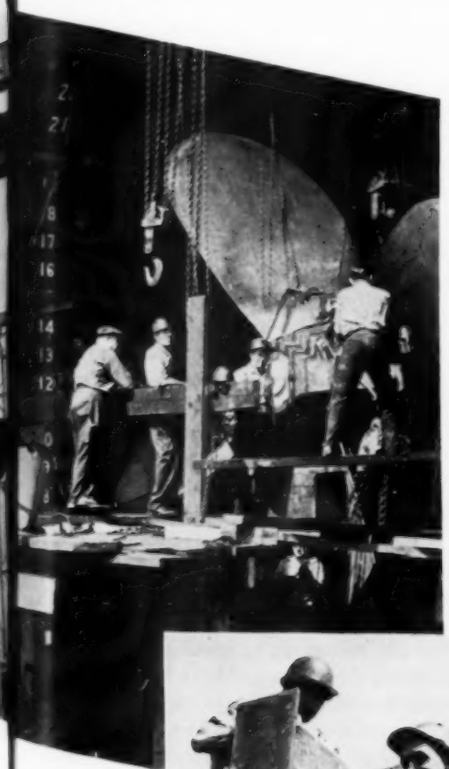
It was in 1936 that the Congress of the United States passed a merchant marine act intended to

give the nation adequate representation on the high seas and established a Maritime Commission to carry out its program. Actual construction under the terms of the act began in 1937-38. It was fortunate for the country that the implementation of the proposal was placed in the hands of two men of vision, energy and broad technical knowledge, Vice Admiral Emory S. Land, who was chairman of the Commission throughout the critical war period, and the late Vice Admiral Howard L. Vickery who as vice chairman had charge of all design and construction in the upbuilding of the greatest merchant fleet the United States ever has owned. These experts attacked their task with vigor and set up a long range schedule designed to provide a well balanced tonnage of merchant shipping in the course of ten years. Contracts were placed with various shipyards for a large number of vessels. The initial order to Sun Ship placed in January, 1938, covered the three tankers — Cimarron, Seakay and New Orleans. This was followed by a contract for six cargo motorships of the C-2 type. Other contracts placed prior to the country's entry into the war called for a total of 114 vessels of which 18, including the three tankers mentioned, were delivered before the start of hostilities. Fifteen were cargo and passenger-cargo ships of C-2 and C-3 types. The first of these was the motorship Donald McKay which was delivered on January 27, 1939. It was followed at monthly intervals by others of these classes. Meanwhile, other yards were engaged in fulfilling contracts that had been placed with them so that by the time of the Japanese attack on Pearl Harbor something over 1,400,000 tons of shipping built under orders of the Maritime Commission were available for use in addition to the tonnage requisitioned from private owners by the government. The foresight of Admiral Land and his associates in having this nucleus of shipping afloat was of tremendous importance in helping the country to meet the first shock of enemy attack when ships were being sunk much faster than they could be built and prevented a crisis even more serious than the one that actually arose.

The impact of war with its tremendously increased demands for ocean transport naturally required a complete revision of the program that had been put under way by the Maritime Commission. Ships were needed at once and in vast numbers that existing yards or those that might be hastily improvised could not possibly produce by ordinary methods. It was then that the scheme for mass production of standard types of vessels was evolved and the Commission put under way the Liberty ship program and the less widely known but no less important plan for a type of tanker that could be turned out in large numbers in conformity with a single set of specifications.

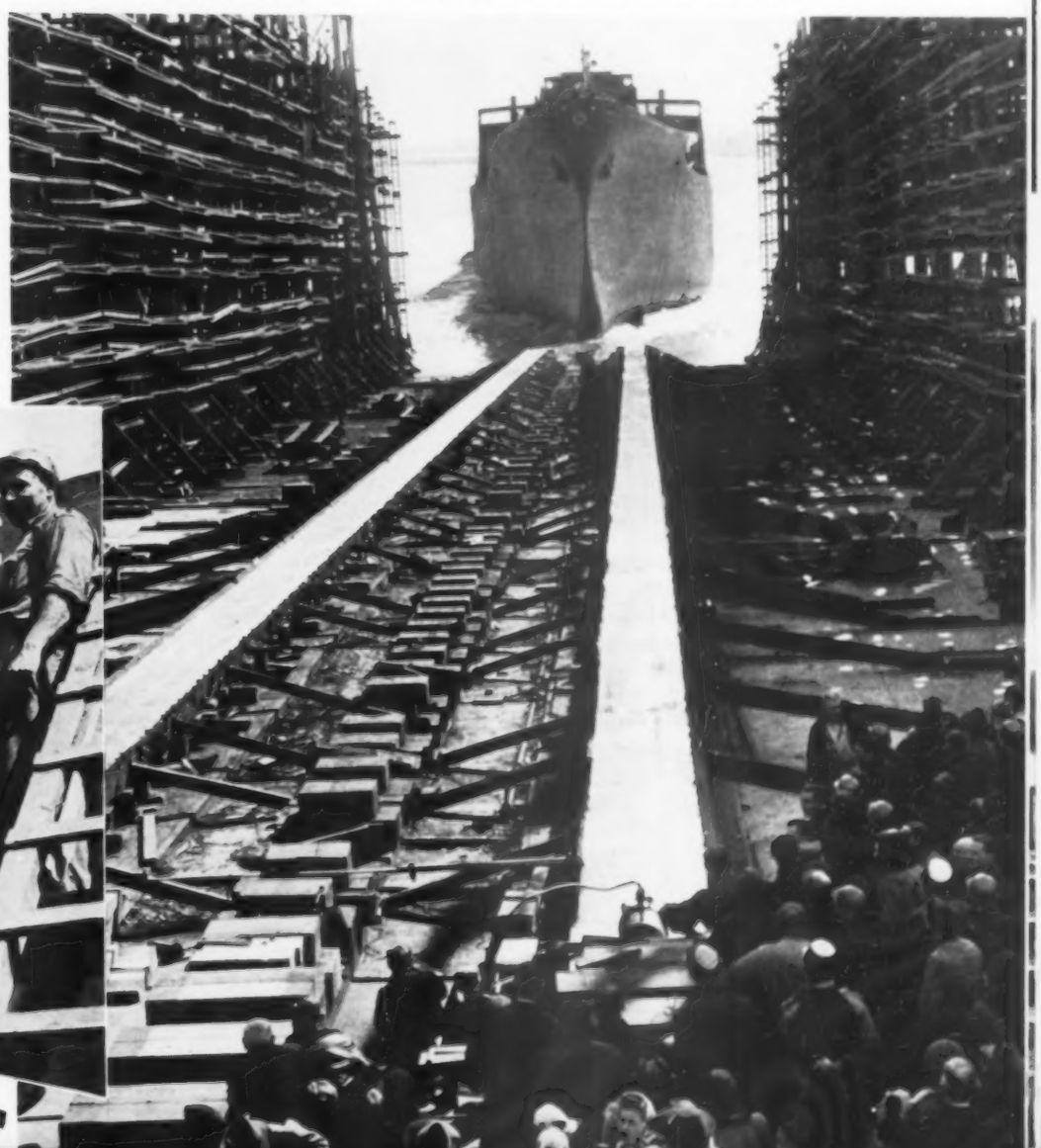
Members of the Maritime Commission and their technical experts had not been oblivious, of course, to the growing threat of war and this realization had been responsible for the speeding up of their construction program as much as possible. They understood that when war did come it would be a conflict of planes and tanks and motorized equipment of many kinds,

Setting the Wheel on the Starboard Shaft of a Sun Ship Tanker



Making Up Longitudinal Bulkhead

The Texas Company's Tanker "Colorado" Slips Down the Ways at the Sun Shipyards



all dependent upon petroleum products of one kind or another for their operation. They foresaw that to supply huge armed forces, far afield, with adequate amounts of liquid fuel would call for a huge fleet of tankers, hundreds of tankers, more than ever had been called into use before. In preparation for the emergency looming ahead the Commission had included what appeared to be generous provision for enlargement of the tanker fleet and had placed orders with Sun Ship for 114 vessels, nearly all of them tankers, before Pearl Harbor.

In accordance with the plan of mass production adopted it was natural that each shipbuilder should concentrate upon a single type of vessel. Because of its close identification with tanker progress, its specialization in that field and because it had been largely responsible for development of the class of tanker adopted as standard for war service, Sun Ship was a logical selection to carry a large part of the load of wartime construction. The original order for 72 tankers was followed by many repeats. In the course of the war Sun yard had contracts for 211 of the standard T-2 type alone. Of these 13 were cancelled after V-E Day leaving a total of 198 of this type the last of which was completed in October, 1945.

This T-2 all welded single screw tanker which was officially designated as T2-SEA-1 was developed by Sun Ship, this ship being a duplicate of a number of previously developed tankers for private concerns, that is duplicate as to hulls except the T2's are without shear. Its specifications are as follows:

Length	503 ft.
Breath	68 ft.
Depth	38'-3"
DWT	16,615 tons
Power (Single Screw, Turbo-electric)	7,500 HP
Speed	15½ knots
Cargo capacity	140,000 bbls.

The vessels were built on the longitudinal framing system of construction. The cargo pumproom, with electric pumps, it is located aft between the machinery space and cargo space. These ships are as modern as shipbuilding skill can make them, are fireproof and comfortably fitted throughout with mechanical heating and ventilation. Quarters are provided for 90 men, officers and crew, not including gun crews.

These are the ships that carried the bulk of the oil that brought victory to the United Nations. The first one completed, the S. S. Gettysburg, was launched on the Deleware Feb. 2, 1942. From 1942 to 1945 a total of 481 were built on order for the Maritime Commission. Forty percent of them were built at Chester. For those constructed elsewhere the plane, templates and construction data worked out at Sun Ship passed on to the other builders to save time and effort on their part.

The sudden increase in the load placed upon Sun Ship by the national emergency required a swift expansion in facilities. Twenty new shipways were added to the eight previously in operation, capacities in all departments were correspondingly enlarged, and new shops and other facilities added. One of the most difficult problems faced by the management was that of finding a sufficient number of employes and of converting these men, mostly without previous mechanical training, into skilled workers in a short period of time. The problem was made more serious by the company's loss of many of its most experienced and valuable men. Some 18,500 of them entered the armed services during the war. Nevertheless, the employment rolls steadily rose, from 7,875 in March 1941 to a peak of 35,633 in July 1943. To fit the thousands of men and women brought into the yard without previous experience training schools were established and short-time courses were set up covering the work of almost every department. Trainees were divided into four groups and instruction was given in (1) engineering, science and management (2) foremen's duties (3) vocational training and (4) job instruction. More than 27,000 employes completed these courses. Some of the instructors were recruited from nearby colleges and a few were drawn from other industrial plants but most of the craft instruction was imparted by yard employes who took great interest in the work. Seventeen training manuals were compiled as text books and more than 178,000 copies were distributed, many to employes of other shipyards.

Women were assigned to manual work in the yard in October 1942 and their number increased to 2,680 at the end of 1944. They filled positions as welders, electricians, tinsmiths and boilermakers as well as in less strenuous tasks. They rendered a good account of themselves but most of them were quite ready to relinquish their jobs as war veterans returned to fill them. Another innovation adopted was the manning of the Number 4 section of the yard including eight ways, chiefly by negro labor. Though regarded as something of an experiment the Number 4 yard employees made good an took great pride in the work turned out by their group. In the autumn of 1943 some 9,000 men were employed in this section and their output included eight troop ships, six hospital ships, five freighters, a tank carrier and 35 car floats.

With a large proportion of green hands, the individual productively average naturally was lower than when practically every worker had the knowhow that comes only with long practice. The time sheets of the company for the war period present an instructive study. The curve of man hours required for construction of a ship rose steadily at first when a large proportion of new workers were added and then, when the workers were more experienced, the man hours dropped to below pre war level.

A matter of great pride to the management and workers at Sun Ship is the record established in the war by the ships they have built. It includes many thrilling incidents as well as a few tragic endings. One of the most remarkable is the feat accomplished by the tanker Ohio in delivering a cargo of gasoline to Malta when that beleagued island was under night and day attack by Axis bombers and its fuel supply was down almost to the last drop. Built in 1940 for The Texas Company the Ohio was later transferred to the British and was sent to the Mediterranean as part of a relief convoy to Malta. Attacked by submarines and planes the ship was torpedoed, bombed and set on fire. Given up as lost by the rest of the convoy which proceeded on its way, the crew subdued the blaze, got the ship underway and rejoined the group the following day. For five days the aerial attacks kept up, starting fires repeatedly while the gun crews fought back bringing down one of the bombers. Finally a shell put the boilers out of commission but a destroyer towed the ship into Malta harbor and the island's garrison. An interesting sequel is that after repairs the Ohio was turned over to Yugoslavia and became the flagship of its Navy.

Another exciting career was that of the Seakay, sister ship of Cimarron, which was converted into a plane carrier and renamed the Santee. In 1942 she participated in the North African invasion, then on a cruise to the South Atlantic rounded up a blockade runner which was scuttled by its crew, attacked and probably sank an Italian submarine. Then, returning to the North Atlantic, she earned the right to decorate her bridge with six German flags representing the number of subs sunk by her crew. Transferred to the Pacific she took part in the long Okinawa campaign and at the battle of Leyte Gulf after being struck by a kamakazi plane which crashed through to her hanger deck and being hit by a torpedo that tore a large hole in her side her

SS Cimmaron Which Fueled Doolittle's Flyers for the Tokyo Raid.

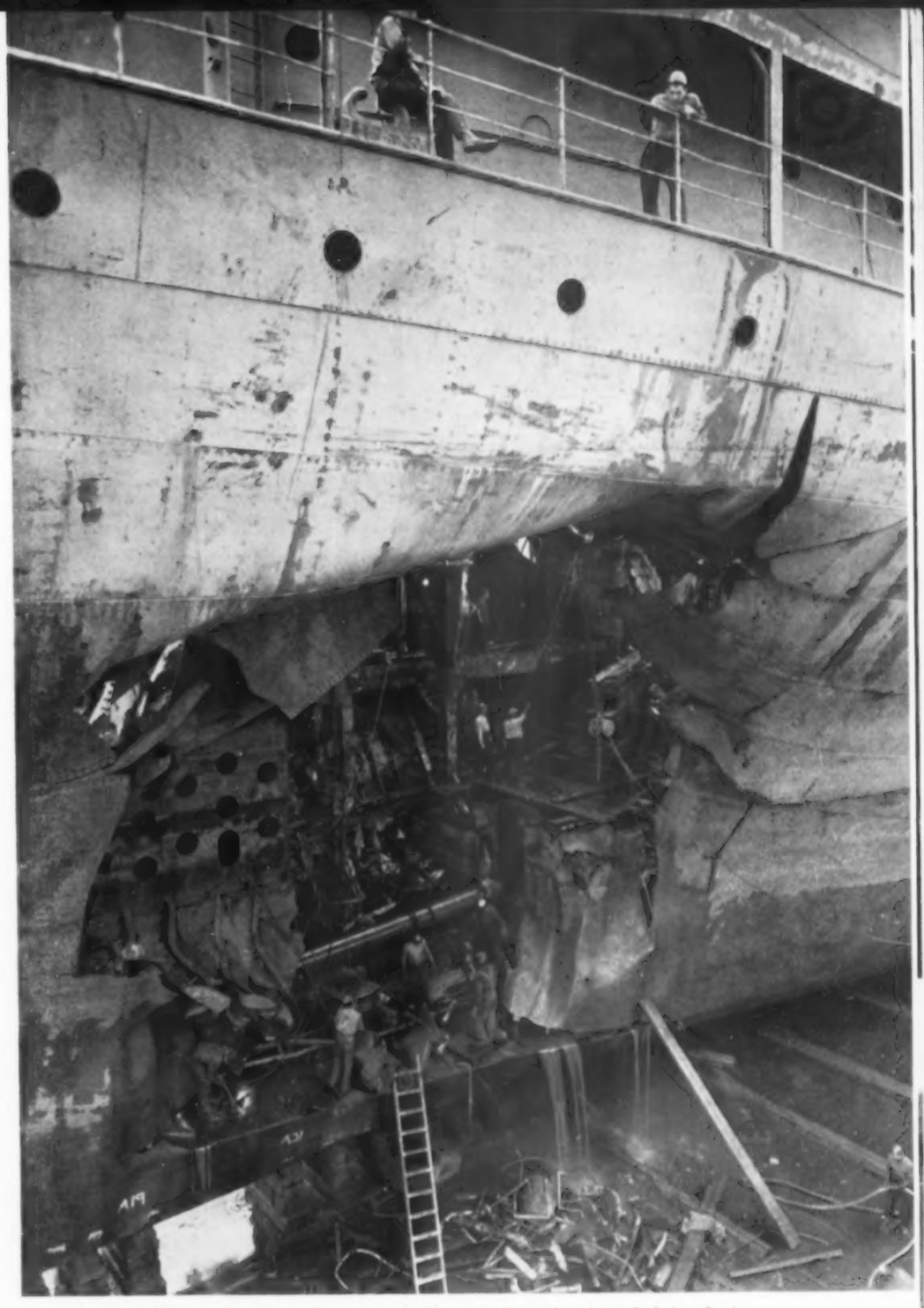
planes carried out an attack on the battleship Misashi and helped drive off the main Japanese fleet. The Santee survived the war and made good her claim to the title of "Queen of the CVES".

Demonstrating an indomitable will to survival, the tanker "Robert Tuttle," after three sinkings, once by torpedo, once by explosion and a third time by storm, was brought into drydock and repaired for further service which included the delivery of more than 8,500,000 barrels of oil to the Allied forces. The Kittaning, built at Chester for Keystone Shipping Company, refused to sink after three torpedo hits received in the Carribean within thirty minutes—one on the starboard and two on the port side. First abandoned by the crew who later reboarded her, she was towed to the Canal Zone for temporary repairs and later brought to a Gulf port for complete restoration. The Pennsylvania Sun, after traveling 550,000 miles with cargoes of fuel for Allied forces, was torpedoed, set on fire and abandoned in the Caribbean. Later the crew returned, extinguished the fire and brought the ship under her own power to her home yard.

These are only a few of the many dramatic stories that enliven the spirits of Sun Ship workers when they discuss the merits of the stout ships in which they feel that they have a living part. The performance of the shipping industry, to which Sun Ship contributed such stirring chapters, was obscured under the veil of military secrecy while the war lasted but it established a shining record to which Americans will look with pride as long as brave deeds and noble achievement inspire their admiration.

While the construction of new vessels was the most conspicuous occupation of Sun Shipbuilding and Dry Dock Company during the war years, it was by no means the only activity. More than 1500 ships damaged by enemy attacks or other causes were repaired in the company's dry docks and wet basins during the war. Some of these repair jobs were remarkable. Such was the case of the E. H. Blum, an Atlantic Refining Company ship, which broke completely in two. The two sections were towed to port and welded together so that the vessel could resume her war service, a feat that would hardly have been possible except in a ship of such high class construction.

In the machinery plant which forms part of the Sun yard, many machine parts for ships repaired at Chester and elsewhere were made. Here also the company continued the building of the celebrated Sun Doxford Diesel engine which powers many of the ships built by Sun Ship and other companies. A related activity which in normal times provides a substantial part of the company's business is the building of oil refinery equipment. During the war this department continued in operation, building cracking case units, fractionating towers, tanks and other refinery



The Oklahoma Survived an Enemy Torpedo Blast, was Repaired and Put Back into Service.

equipment required at home and for shipment to Russia, Iran, Arabia and other distant oil producing areas to aid in the provision of petroleum products for use of the United Nations.

Although the enormous pressure of insatiable war demand has been lifted the yard on the shore of the Delaware is still a hive of bustling activity. Ships are being built, ten freighters of 12,500 tons for the Netherlands government five high speed tankers for the United States Navy and several other tankers for private oil companies. The shops resound to the fabrication of oil industry equipment destined for shipmem to all parts of the world. And in the modest executive offices in the center of the yard sits John G. Pew directing his small army of workers with a firm hand and a kindly interest in their welfare. At 75 he is as sprightly as the youngest apprentice and one of the hardest workers in the entire organization. To him the building of a giant fleet during five gruelling war years was just a task imposed in the line of duty to help preserve the American way of life a tough job but one from the performance of which much satisfaction was derived. Today he is looking to the future, to the application of new ideas in ship construction and to the strengthening of benefit plans that he has long fostered for the boys in the yard.

Oil Company 1945 Earnings

Fell Below Preceding Year

By Henry E. Rose

SPECIAL non-recurring charges against income—principally accelerated amortization of war plant facilities as permitted by Presidential proclamation at the war's end — were responsible for a four percent reduction in net profits of the American oil industry in 1945 as compared to the record year 1944. The year marked a new peak in business volume and except for these additional charges a new high in net profits would have been established.

While forecasts of the industry's leading economists indicate that total consumption of all oil products in 1946 will not be as high as in 1945, they agree, almost unanimously, that this year's volume will be the largest of any peacetime year and materially above that for 1941, the last pre-war year. Company executives, too, have been making comparisons with operations in 1941 rather than with the abnormal war year of 1945.

It is clearly evident, however, that there will be changes in product demand in 1946 and following years. The consumption of motor fuel, heretofore the main money product, is not likely to be in first place from the standpoint of volume in 1946, and probably in 1947, because of the stoppage of motor car manufacture and the expected junking of many cars still on the road. Against this, a sharp expansion in demand has taken place for the less profitable fuel oils, partly in reflection of wartime conditions when the manufacture of Diesel engines was increased materially and hundreds of oil-burning ships were placed in operation. The home building program now under way in the United States also points to a rapidly expanding market for oil consumption in domestic heating units.

Thus far in 1946 profits of the nation's leading oil companies have been running moderately behind those in 1945, although in a few instances gains have been registered. For twenty companies reporting for the first quarter, ended March 31, net profits aggregated $68.8 millions against $76.5 millions in the corresponding period of 1945, a reduction of 11.2 percent. In comparison with 1941, the last pre-war year, however, the industry, as a whole, has shown an increase of almost 80 percent in total profits.

Of eighteen companies for which a comparison with 1941 can be made, increases in profits were reported by sixteen as compared with five years ago. Seven companies had gains against the first quarter of 1945. Integrated companies fared slightly better than the solely producing companies since the former are obtaining the benefit of unrestricted civilian sales of refined products this year whereas in 1945 gasoline and fuel oil were on a rationed basis. The producing companies, in line with curtailed overall demand and reduced output ordered by state regulatory bodies, had smaller profits.

Demand for oil products has shown varying changes in different geographical areas since VJ-day. This has been especially true in respect of motor fuel. During the war, when motor car manufacture was stopped, sales of used cars were made in the east for shipment to interior points where war industries were established, and centers of population in the middle west and far west were moved. In reflection of this westward migration, operations of the oil companies on the west coast have shown marked gains compared with a year ago, especially in relation to motor fuel. The gains on the east coast, on the other hand, have been smaller. Examples of this shift are provided by the reports of representative companies.

Here is a sample of what is happening in the Phillips Petroleum Co. with its marketing territory throughout the middle west had sales of motor fuel in the first quarter of 1946 25 percent greater than for the same period of 1945 and 28 percent higher than in the pre-war year of 1941. Socony-Vacuum, which has a major share of the New York and New England market, and also has a sizable stake in foreign markets, reported its sales of all products, domestic and foreign, about 16 percent less than in the first quarter of 1945, but 35 percent higher than in the same three months of 1941.

In Table I is shown net profits and per share earnings of twenty leading American companies for the first quarter of this year with comparisons for a year ago and for the same period in 1941.

The American oil industry, as represented by 23 leading companies whose shares are traded on recognized exchanges, had net profits in 1945 of $655,492,000, a reduction of four percent compared with the peak of $684,068,000 earned in 1944. Last year's reduction in profits, as mentioned earlier in this article, was due chiefly to special charges against income in the form of accelerated amortization of war plant facilities as allowed by Presidential proclamation incident to the cessation of hostilities last year. In volume and dollar value, sales of the American industry in 1945 hit a new high record.

Last year's profits of the 23 companies, after all charges, including taxes, and allowing for dividends on preferred stock for those companies which had such stock outstanding, were equal to $3.28 a share on the 196,569,816 shares of common stock and compared with the equal of $3.45 a share on 195,946,441 shares of common stock outstanding in the peak year of 1944.

Fourteen of the companies had increases in profits, and of this number twelve established new records. Nine had reduced profits in 1945 as compared with 1944, and among the latter were such companies as Standard (N.J.); Socony-Vacuum, Standard of Indiana, Texas, Sinclair, Atlantic Refining, Ohio, Pure and Standard of Ohio; many of whom made sizable charges to income for amortization of war facilities.

While number of companies undertook refinancing of their fixed, or long term, debts during 1945; and some have since made progress in this direction in the current year, the list of those with such debt outstanding stood at nineteen, unchanged from the end of 1944. The total of debt outstanding at the close of last year, however, showed an aggregate reduction of $20 millions and totaled $952 millions. The peak of this debt was $1,059 millions for 20 companies at the end of 1942.

Twelve companies reported reduction in their long term debt last year, the largest of $30 millions by Sun Oil Co. lowering its outstanding indebtedness to $4.5 millions; Socony-Vacuum reduced its debt by $18 millions; Texas by $10 millions; Union by $13 millions and Standard of N. J. by $11 millions, with the remainder of the reductions being for smaller amounts.

Seven companies increased their long term debts last year, most of the additions being small and unimportant. Sinclair, however, closed the year with a debt of $110.4 millions against $61.7 millions a year earlier, while Atlantic Refining's debt of $40.1 millions compared with $31 millions at the end of 1944.

Sinclair borrowed $50 millions late in 1945 from

banking institutions in the form of 10-year serial notes bearing an interest rate of 1¾ percent. From the proceeds the company retired $24,050,-785 of indebtedness and added approximately $26 millions to working capital. In addition it had a $60 millions issue of 2¾ percent 20-year sinking fund debentures outstanding.

Skelly Oil Company, in the summer of 1945, sold $10 millions of 20-year 2¾ percent debentures using the proceeds to redeem its outstanding $10 millions of three percent debentures due in 1950.

Socony-Vacuum Oil Co., in August last, called for redemption its $64.5 millions of 2⅞ percent debentures using $50 millions obtained in the form of a bank loan costing an average interest rate of 1.72 percent. At the present time Socony is reported to be exploring the possibility of refunding $50 millions of three percent sinking fund debentures which it has outstanding and possibly a part of the $50 millions serial notes now held by banks, into lower rate issues and for a longer period.

Union Oil Co., in July, 1945, offered 25 millions of 2¾ percent, debentures and 250,000 shares of the company's no par $3.75 cumulative preferred stock, using the proceeds to redeem $25.6 millions of three percent debentures and to repay two percent promissory notes in an amount of $12 millions. The remainder was added to working capital.

Standard Oil Co. of Ohio and Tide Water Associated Oil Co. sold stock issues in 1945 in order to retire other stock issues and to add to working capital funds. Standard of Ohio's offering consisted of 200,000 shares of new 3¾ percent cumulative preferred stock, series A, of $100 par, using the proceeds for prepayment of bank notes and mortgages aggregating $4,163,975 and for the redemption of the company's then outstanding 120,000 shares of five percent cumulative preferred, and 19,471 shares of 4¼ percent preferred stock.

In the case of Tide Water, it offered 300,000 shares of $3.75 cumulative preferred stock, no par, setting aside 172,398 of the shares for exchange of its $4.50 preferred stock, with the remainder of 127,602 being offered to the public.

Pure Oil Co., in October, retired 282,997 shares of six percent preferred stock which it had outstanding.

Since the beginning of the year, Shell Union Oil Corp. has sold $125 millions of 2½ percent debentures due July 1, 1954, using $5,835,-000 to prepay serial notes, $66,155,000 of 2½ percent debentures due 1954 and $13,071,000 of 20 year 2¾ percent sinkin fund debentures due in 1961.

Standard Oil Co. (N.J.) has recently sold an issue of $85 millions of 2-3/8 percent debentures due 1971 which provided funds for the retirement of a like amount of three percent debentures due in 1961. Earlier this year Atlantic Refining Co. offered a new issue of $25 millions 2-5/8 percent 20-year debentures and 102,000 shares of new $100 par cumulative 3.60 percent preferred stock, using the proceeds for the acquisition and development of new production.

Early in May stockholders of Amerada Petroleum Corporation, at a special meeting, approved the splitting of the company's capital shares on a 2-for-1 basis, while a little more than a year ago stockholders of Standard Oil Co. (Ohio) voted to split the company's common capital on a 2½-for-1 basis.

Net working capital of the 23 American oil companies stood at a new high at the end of 1945, totalling $2,538,762,000 against $2,076,953,000 a year previously, an increase of better than 21 percent. While the total looms big it will be used, in large part, for modernization and new construction, and for expanded exploration, much of which could not be conducted during the war years because of the non-availability of materials. For companies engaged in the foreign field where extensive destruction of facilities was caused by the war, expenditures are likely to be high over the next few years for rehabilitation.

This was indicated by the head of Socony-Vacuum Oil Co., Inc., in his annual report to stockholders. He said that certain major items of plant expansion and improvement will be undertaken as soon as conditions permit and the "expectations are that the company's budget for capital expenditures will, for sometime, be 50 percent or more, above average pre-war capital expenditures."

International Petroleum Co., which is affiliated with Standard Oil Co. (N.J.) through Imperial Oil, Ltd., recently reduced its dividend payment because of the need for large expenditures in exploration and development in South American countries.

While profits for the American oil industry in 1945 were lower than in 1944, cash dividends on common stock, in the aggregate, hit a new peak at $307,134,000 against $298,297,000 in 1944 and $248,674,000 in 1941, the last pre war year.

Five companies: namely, Continental Oil Co., Mid-Continent Petroleum Co.; Shell Union Oil Corp.; Sinclair Oil Corp. and Skelly Oil Co., disbursed more last year than in 1944, while Pure Oil and Socony-Vacuum paid out less.

Standard Oil Co. (N.J.) head the list with the largest disbursement of $69,344,332, followed by Texas with $28,111,650; Humble with $26,-963,520; Shell Union with $26,205,938 Standard of California with $26,007,906; Standard of Indiana with $22,927,295, and Socony-Vacuum with $20,265,910. Payments by others amounted to less than $20 millions annually.

In the accompanying tabulation is shown the net earnings, working capital, funded debt, surplus and other financial data for the 23 American oil companies for 1945 and four previous years. In addition there is included the same material for two companies operating in foreign territory; namely Imperial Oil, Ltd. and Creole Petroleum Corporation.

TABLE I

COMPARISON OF FIRST QUARTER EARNINGS

	1946		1945		1941	
	Net Income	A Share on Com.	Net Income	A Share on Com.	Net I Income	A Share on Com.
Amerada	$1,463,072	$1.86	$1,587,862	$2.01	$ 506,644	$.44
Atlantic	1,902,367	.63	2,706,602	.96	2,747,510	.98
Barnsdall	1,022,406	.46	1,021,233	.46	486,569	.21
Houston Oil	651,238	.59	800,445	.60	423,280	.20
Lion Oil	307,783	.17	293,191	.67	125,574	.29
Ohio Oil	3,981,762	.61	3,411,230	.52	1,933,772	.22
Phillips	4,244,933	.86	9,145,293	*1.86	3,307,892	.74
Plymouth	342,936	.33	499,352	.48	245,806	.24
Seaboard	395,719	.32	738,271	.60	264,358	.21
Shell Union	7,727,503	.57	8,461,601	.63	3,621,794	.28
Socony-Vacuum	11,000,000	.35	11,000,000	.35	N.A.	
Standard Cal.	14,530,519	1.12	14,477,052	1.11	4,799,184	.37
Standard Ohio	2,025,909	.67	1,407,315	.52	N.A.	
Skelly	1,628,302	1.65	1,767,810	1.80	898,917	.91
Sunray	448,283	.13	413,823	.12	723,442	.18
Texas Co.	11,214,961	1.00	12,215,100	1.09	6,600,000	.61
Texas Pac. Coal & Oil	348,027	.39	525,519	.59	195,597	.22
Tidewater	3,744,555	.54	4,322,929	.59	2,859,950	.36
Univ. Consol.	53,810	.29	71,681	.39	1,961	.01
Union Oil	1,815,492	.34	1,780,294	.38	1,273,006	.27
Totals	$68,849,577		$76,646,603		(a) $31,014,256	

(*)Including 61 cents a share of non-recurring profit from the sale of stock in another company.
(N.A.) Not published quarterly in this year.
(a) Only 18 companies against 20 in 1946 and 1945.

FIVE YEAR FINANCIAL REVIEW OF

		Net Income	Per Share of Com.	Net Working Capital	Net Capital Assets	Funded and or Long Term Debt	No. of Pref. Shares	No. of Com. Shares	Surplus
Amerada Corp.									
1945		$5,396,770	$6.84	$9,471,634	$17,225,600	.....	.....	788,675	$15,560,710
1944		5,285,988	6.70	8,566,051	15,927,801	.....	.....	788,675	13,585,670
1943		4,781,771	6.06	8,615,413	13,434,753	.....	.....	788,675	10,665,707
1942		3,271,885	4.15	5,542,107	12,714,027	.....	.....	788,675	7,461,287
1941		2,569,560	3.26	3,473,258	12,682,721	.....	.....	788,675	5,766,751
Atlantic Refining Co.									
1945		1,509,107	.34	46,293,657	189,688,970	40,179,220	148,000	2,663,998	115,626,758
1944		14,710,913	5.30	45,675,417	192,279,722	31,009,123	148,000	2,663,998	118,061,797
1943		10,687,828	3.79	44,630,707	180,655,671	32,632,928	148,000	2,663,998	105,669,559
1942		6,800,002	2.33	53,403,548	158,643,694	26,305,709	148,000	2,663,998	96,943,179
1941		14,346,229	5.16	44,036,326	161,670,211	25,024,849	148,000	2,663,998	92,643,137
Barnsdall Oil Co.									
1945		4,389,779	1.97	6,533,192	17,798,321	.....	.....	2,223,307	13,717,216
1944		3,674,766	1.65	5,498,163	15,977,894	.....	.....	2,223,307	10,861,185
1943		3,602,764	1.62	5,546,689	14,233,620	.....	.....	2,223,225	9,024,509
1942		2,801,846	1.26	3,752,756	14,139,303	.....	.....	2,223,579	7,109,812
1941	(B)	5,026,202	2.25	2,928,159	12,897,743	3,140,000	.....	2,231,879	5,657,951
Continental Oil Corp.									
1945		15,142,870	3.23	21,367,915	107,941,335	2,101,890	.....	4,682,557	111,885,294
1944		12,020,527	2.57	30,132,843	88,999,748	1,518,244	.....	4,916,987	103,234,221
1943		14,080,702	3.00	32,727,193	82,290,941	2,806,743	.....	4,682,561	100,004,761
1942		14,924,698	3.19	27,954,923	82,045,727	5,859,055	.....	4,682,563	91,806,436
1941		15,398,082	3.29	17,646,983	82,010,052	8,714,875	.....	4,682,565	81,564,115
Creole Petroleum Corp.									
1945		64,601,781	2.43	47,301,411	169,296,022	.....	.....	26,606,610	105,585,408
1944		62,020,396	2.33	37,850,361	166,578,162	.....	.....	26,606,610	74,241,889
1943	(C)	28,559,169	1.07	20,788,692	154,684,278	.....	.....	26,606,610	45,479,756
1942		3,469,000	.50	4,360,149	75,539,403	.....	.....	6,974,356	45,720,611
1941		12,297,275	1.76	8,193,304	73,259,828	.....	.....	6,974,356	47,679,036
Gulf Oil Corp.									
1945		45,213,640	4.98	91,459,870	446,736,575	49,360,719	.....	9,076,202	208,315,892
1944		42,075,513	4.64	101,635,902	409,833,584	48,443,118	.....	9,076,202	181,254,656
1943		29,301,053	3.29	101,190,142	382,301,066	52,992,991	.....	9,076,202	153,516,655
1942		22,981,562	2.53	79,139,104	378,603,898	42,912,760	.....	9,076,202	137,829,905
1941		33,568,624	3.70	80,951,044	372,056,770	46,155,801	.....	9,076,202	128,462,646
Humble Oil & Refining Co.									
1945		70,895,006	3.94	101,848,186	384,198,125	43,613,457	.....	17,975,680	269,853,441
1944		60,525,774	3.37	82,299,423	353,559,531	42,662,491	.....	17,915,680	221,796,955
1943		45,711,511	2.54	70,668,062	341,516,999	53,533,744	.....	(E) 17,975,680	188,234,701
1942		29,243,303	3.25	56,022,566	336,571,341	52,570,414	.....	8,987,840	164,992,790
1941		35,356,558	3.93	45,823,214	325,080,832	42,014,167	.....	8,987,940	154,036,877
Imperial Oil, Ltd.									
1945		16,616,586	.61	74,521,062	38,333,859	.....	.....	26,965,078	59,286,892
1944		16,192,670	.60	74,702,544	38,879,829	.....	.....	26,965,078	59,441,568
1943		15,548,873	.57	69,604,722	40,455,813	.....	.....	26,965,078	56,345,318
1942		14,663,097	.54	60,583,509	44,826,797	.....	.....	26,965,078	54,021,208
1941		16,144,069	.60	56,767,380	43,103,735	.....	.....	26,965,078	53,383,418
Mid-Continent Petroleum Corp.									
1945		8,062,792	4.34	34,829,652	41,594,097	.....	.....	1,857,912	56,581,775
1944		6,942,038	3.74	35,820,077	37,201,893	.....	.....	1,857,912	54,341,053
1943		6,566,618	3.53	32,729,621	36,450,773	.....	.....	1,857,912	50,583,350
1942		6,112,158	3.29	30,603,308	35,443,077	.....	.....	1,857,912	47,465,394
1941		4,866,036	2.62	25,110,651	36,035,163	.....	.....	1,857,912	44,893,313
Ohio Oil Co.									
1945		13,949,822	2.13	37,001,770	79,673,840	9,500,000	.....	6,563,377	51,804,212
1944		15,082,127	2.30	30,683,091	80,316,287	11,000,000	.....	6,563,377	44,417,766
1943		14,146,802	2.14	26,347,464	76,236,983	12,500,000	.....	6,563,377	35,899,013
1942		12,508,953	1.74	22,779,178	80,310,995	12,500,000	57,046	6,563,377	31,015,260
1941		10,799,736	1.42	24,895,921	89,838,837	15,500,000	212,233	6,563,377	24,405,355
Phillips Petroleum Co.									
1945		22,571,509	4.50	42,310,294	222,698,646	45,989,518	.....	4,916,987	81,390,909
1944		20,952,088	4.26	30,752,672	235,972,999	48,812,688	.....	4,916,987	68,853,374
1943		14,168,422	3.04	24,494,808	205,917,876	28,707,826	.....	4,916,987	57,535,250
1942		13,129,457	2.95	33,630,615	188,723,195	38,608,431	.....	4,492,980	52,739,178
1941		17,346,977	3.92	30,001,026	180,708,712	33,923,259	.....	4,449,052	48,507,824
Pure Oil Co.									
1945		13,581,770	2.64	55,486,989	126,537,915	.....	442,434	3,982,031	72,094,085
1944		16,392,178	3.11	40,060,767	(A) 133,029,554	2,415,806	725,431	3,982,431	(A) 67,813,020
1943		13,874,517	2.50	32,089,974	151,721,887	2,829,457	725,431	3,982,031	78,833,591
1942		13,761,826	2.47	30,915,653	126,026,907	3,174,175	725,431	3,982,031	71,853,446
1941		15,285,255	2.86	24,719,281	123,223,061	2,952,147	725,431	3,982,031	63,990,259
Seaboard Oil Co.									
1945		2,720 022	2.20	3,332,211	8,508,948	1,733,333	.....	1,234,233	6,663,989
1944		1,881,284	1.52	3,452,654	7,841,302	2,433,333	.....	1,234,235	5,178,190
1943		1,949,096	1.58	4,512,666	7,410,791	3,040,000	.....	1,234,237	4,097,062
1942		1,463,706	1.18	3,314,271	7,620,841	3,440,000	.....	1,234,252	3,816,255
1941		1,257,367	1.02	2,118,383	4,546,182	.....	.....	1,229,083	3,146,415

UNITED STATES OIL COMPANIES

	Net Income	Per Share of Com.	Net Working Capital	Net Capital Assets	Funded and or Long Term Debt	No. of Pref. Shares	No. of Com. Shares	Surplus
Shell Union Oil Corp.								
1945	$28,712,328	$2.13	$146,416,443	$175,254,538	$81,641,000	.....	13,470,625	$50,579,277
1944	28,163,961	2.09	114,096,944	213,471,518	84,873,000	.....	13,470,625	50,404,897
1943	24,542,556	1.82	90,151,050	222,510,924	94,135,000	.....	13,470,625	42,446,874
1942	16,860,007	1.28	95,774,423	199,551,494	104,278,000	.....	13,070,625	34,086,647
1941	17,334,214	1.32	84,067,926	228,964,879	108,961,000	.....	13,070,625	36,648,283
Sinclair Oil Corp.								
1945	15,644,749	1.30	158,722,855	213,268,030	110,475,065	.....	11,974,058	230,182,487
1944	27,367,794	2.28	92,255,494	241,573,524	61,706,525	.....	11,974,094	226,508,979
1943	23,083,709	1.85	89,494,580	239,682,758	66,801,857	.....	12,928,205	209,148,169
1942	18,060,598	1.42	101,393,765	216,238,439	92,395,928	.....	13,651,405	193,038,459
1941	16,472,494	1.25	83,592,829	216,209,874	79,588,000	.....	13,128,953	181,692,426
Skelly Oil Co.								
1945	8,531,274	8.69	16,597,603	67,161,858	17,200,000	.....	981,349	51,104,336
1944	7,222,903	7.36	11,541,852	58,319,784	10,000,000	.....	981,349	44,535,759
1943	5,461,708	5.56	11,772,045	53,808,491	11,200,000	.....	981,349	39,154,199
1942	5,632,805	5.73	11,863,363	52,375,519	13,600,000	.....	981,348	35,164,513
1941	5,913,826	6.02	8,445,051	51,063,964	14,800,000	.....	981,348	30,758,394
Socony-Vacuum Oil Co., Inc.								
1945	42,301,983	1.36	274,222,734	509,955,895	100,315,279	.....	31,178,323	321,695,393
1944	62,349,556	2.00	280,510,156	511,462,505	118,077,823	.....	31,708,452	229,990,725
1943	35,944,983	1.15	271,335,854	499,503,866	126,716,312	.....	31,708,452	191,024,911
1942	30,808,397	.99	234,062,698	481,070,509	123,674,996	.....	31,708,452	170,669,089
1941	43,175,902	1.38	216,888,148	471,740,585	126,383,580	.....	31,708,452	155,449,853
Standard Oil Co. of California								
1945	55,548,628	4.27	113,442,810	473,027,029	38,500,000	.....	13,003,953	284,503,528
1944	43,467,997	3.34	122,616,220	466,865,826	40,000,000	.....	13,003,953	260,871,654
1943	36,116,060	2.78	111,393,415	466,335,156	40,000,000	.....	13,003,953	245,657,323
1942	30,558,547	2.35	93,310,560	470,851,310	40,000,000	.....	13,003,935	239,748,878
1941	29,909,421	2.30	103,755,136	455,881,836	40,000,000	.....	13,003,953	231,337,260
Standard Oil Co. of Indiana								
1945	50,340,476	3.29	222,713,624	530,228,098	19,303,041	.....	15,284,860	437,538,439
1944	59,225,578	3.87	181,904,301	539,352,256	12,042,641	.....	15,284,864	409,881,287
1943	50,591,371	3.31	186,639,059	498,147,998	17,537,965	.....	15,284,876	377,731,563
1942	44,183,893	2.89	203,989,055	443,433,258	16,453,283	.....	15,284,892	348,050,454
1941	48,385,967	3.17	185,923,067	431,134,060	14,698,741	.....	15,284,935	319,452,179
Standard Oil Co. (N. J.)								
1945	154,156,196	5.64	779,818,746	1,137,441,311	203,129,907	.....	27,333,742	857,287,258
1944	155,396,460	5.69	697,078,842	1,103,125,811	214,855,260	.....	27,333,742	697,078,482
1943	121,327,773	4.45	585,859,209	1,092,251,188	232,157,560	.....	27,283,587	672,584,273
1942	83,361,920	3.06	495,667,607	1,104,036,333	248,072,906	.....	27,283,587	642,011,149
1941	140,572,419	5.15	506,275,556	1,040,832,931	194,512,825	.....	27,283,587	636,189,422
Standard Oil Co. of Ohio								
1945	3,713,161	1.10	39,045,305	76,463,002	16,566,863	238,665	(D) 2,676,383	43,686,806
1944	6,744,014	7.07	24,173,817	74,989,555	20,199,617	221,389	807,585	41,466,795
1943	4,905,634	5.68	20,098,777	67,853,801	22,179,387	221,389	758,519	37,729,768
1942	5,649,880	6.68	26,286,564	57,335,786	23,151,743	120,000	756,265	34,437,272
1941	6,249,443	7.47	17,566,209	51,799,637	9,446,676	120,000	752,265	31,088,988
Sun Oil Co.								
1945	15,666,543	4.44	47,936,056	102,480,572	4,588,218	93,197	3,434,944	25,798,504
1944	13,350,217	4.15	60,254,429	110,955,911	34,739,756	93,197	3,119,582	27,344,493
1943	13,353,524	4.56	59,380,803	104,366,531	35,894,794	93,197	2,838,929	27,062,509
1942	8,671,050	2.91	50,339,826	99,510,033	29,025,154	93,107	2,838,929	18,263,495
1941	16,532,540	6.21	36,011,101	93,470,154	21,007,495	93,107	2,850,826	13,604,990
The Texas Co.								
1945	51,856,928	4.61	186,332,038	398,787,324	114,498,906	.....	11,244,660	316,801,859
1944	54,516,819	4.85	176,565,106	431,780,673	124,600,469	.....	11,244,660	293,056,581
1943	42,889,797	3.83	176,654,852	415,353,085	123,998,331	.....	11,186,279	265,299,559
1942	35,060,001	3.32	174,619,189	368,886,617	106,000,000	.....	10,875,627	237,718,261
1941	51,874,681	4.77	148,797,057	366,505,822	111,801,380	.....	10,875,800	222,837,338
Tide Water Associated Oil Co.								
1945	18,107,712	2.57	48,056,917	140,459,899	14,250,000	287,887	6,396,809	84,937,733
1944	17,787,202	2.43	49,971,786	147,485,770	21,250,000	500,000	6,386,809	61,118,436
1943	14,902,640	1.98	58,391,066	133,722,641	30,436,400	500,000	6,389,394	50,267,921
1942	10,663,930	1.32	49,561,629	134,115,502	33,436,400	500,000	6,375,364	42,890,964
1941	15,564,093	2.09	42,482,262	137,982,146	36,936,400	500,000	6,374,033	37,342,776
Union Oil Co. of California								
1945	9,201,123	1.87	56,487,921	154,637,919	40,000,000	250,000	4,666,270	33,399,667
1944	8,932,994	1.91	34,357,126	168,599,514	53,700,000	.....	4,666,270	32,248,766
1943	7,269,199	1.56	41,071,274	144,962,486	42,544,000	.....	4,666,270	27,525,466
1942	5,537,329	1.19	48,758,124	133,893,458	43,639,000	.....	4,666,270	24,249,828
1941	6,239,232	1.34	36,622,981	130,271,906	37,480,000	.....	4,666,270	23,540,595

(A) Giving effect to writeoffs in November, 1944, of $19,523,031 of patents, rights, trademarks, etc.
(B) Including a non recurring profit of $2,515,996 from the sale of West Texas lands.
(C) Adjusted to give effect to Lago Petroleum Corp. earnings for all of 1943.
(D) Common stock split 2- for 1 in 1945.
E) Stock split two-for-one late in 1943, and per share net is on larger share basis.

ITALY'S ECONOMIC RECOVERY Depends On Oil Supplies

Government Seeking Means to Obtain and Pay for Imports — Plans Return of Refineries to Owners and Restoration of Road Transport

By Antonio Giordano

OIL products held a place of special importance in the industrial life of Italy in the years before the war. Lack of other fuels led to the early adoption of oil for rail car propulsion, of Diesel engines in the mercantile marine and of oil burning devices in industrial plants. Having no domestic production of consequence, the country had to depend on imports for its liquid fuel supply. In the three years preceding the start of war in Europe these imports were as follows:

Year	Metric Tons
1937	3,662,266
1938	4,525,828
1939	4,483,904

Of these supplies something over two-thirds were drawn from the Western Hemisphere and the remainder came from Romania and the Middle East. The origin of products imported in 1939 was as follows:

Area	Metric Tons
Mexico & South America	2,058,575
United States	1,023,856
Black Sea & Levant	1,022,788
Countries East of Suez	258,266

Market requirements in that period are indicated by the following figures showing consumption of various products in 1938, exclusive of military requirements:

Products	Metric Tons
Gasoline	442,000
Aviation gasoline	35,000
Kerosene	178,100
Gas oil	263,500
Fuel oil	1,787,000
Lubricating oil	92,000
Special oils	13,500
Paraffine	25,000
Asphalt	85,500
Petroleum coke	52,000

During the war shipments from overseas came to an end. Italy was forced to depend upon Germany for greatly reduced supplies from Poland and Romania but the movement of even limited quantities by rail was attended by many difficulties in view of the fact that these same lines had to handle coal imports and other traffic arising from the war. To help this situation the Societa Italiana Navigazione Danubiana (SINDA) was organized to carry Romanian oil by inland waterways to Sisek, Croatia, and thence by motor truck to Italy. It also projected a pipe line from Sisek to the refinery at Fiume but this was not built.

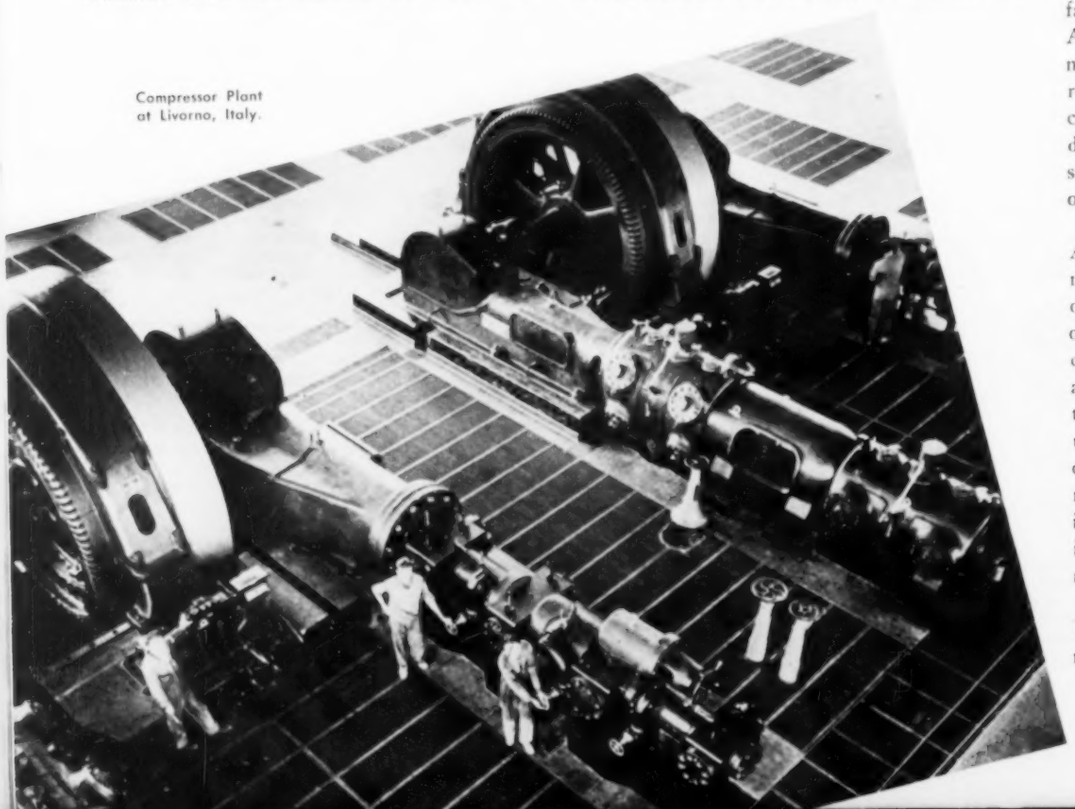
Throughout the war petroleum supplies were inadequate even for essential needs and when the war ended, the country was entirely without oil. For the months immediately following it was necessary to depend upon Allied military forces to provide road transport for the carriage of food and other supplies to prevent famine. The number of local vehicles had been so greatly reduced that even had fuel supplies been ample they could not have satisfied the country's needs. The situation in this respect is indicated by the following statistics of the change that took place between December 31, 1939 and the corresponding date in 1945:

	1939	1945
Automobiles	359,974	60,000
Passenger buses	10,165	5,000
Tractors (road)	1,069	780
Tractors (agricultural)	19,237	11,350
Trucks	109,579	30,000
Motors cars	4,070	2,500
Motorcycles	211,020	102,000
Diesel & gasoline rail cars	1,500	500

The decline is facilities for water transport was equally great, the country's merchant shipping falling from 3,500,000 tons to 400,000 tons.
An estimate prepared by the Institute of Economic Research in Rome places Italy's annual requirements of petroleum products under present conditions at 2,704,900 tons less a possible deduction of 35,000 tons which might be substituted by methane gas. In addition 108,000 tons of lubricating oil are needed.

After the transfer of authority from the Allied military to the Italian government the control of motor cars and trucks was placed in the hands of the Uffici Autotrasporti. Buses and trucks received quotas varying between 10 and 60 liters according to their carrying capacity. The control system centralized the distribution of products and brought protests from car owners because of inability to obtain supplies along the roads. The number of commercial cars available is only one-third to one-fifth of those in operation in 1939, but the industrial activity at present is no more than 40 percent of its pre-war volume.

Upbuilding of the transport system necessarily must come from the resumption of normal produc-



Compressor Plant at Livorno, Italy.

tion by Italian automobile manufacturers or from the importation of foreign cars built for civil use. As a temporary recourse the Italian government bought from Allied military authorities numbers of American trucks. With the heavy gasoline consumption of these trucks and the high price of gasoline it was found that the cost of fuel absorbed nearly 50 percent of the receipts from the payload while with Italian-built Diesel engined cars the outlay for fuel is only 25 percent. Fiat is building from 1,000 to 1,300 trucks per month; Isotta Fraschini (Milano) and O. M. (Brescia) from 130 to 160 each. Adding to these the output of Alfa Romeo, Bianchi and others Italian manufacturers are turning out 20,000 to 24,000 trucks yearly. At this rate it would take three years to provide the country with the same number of commercial vehicles it had in 1939.

On the side of supply, the Italian refineries suffered seriously from bombing attacks and other forms of war damage. As a consequence, their throughput capacity has been reduced from 1,800,000 tons in 1938 to perhaps 700,000 to 750,000 tons, a decline of about 60 percent. The relative position of the different plants may be stated roughly as follows:

Refinery	Throughput in tons, 1939	Throughput in tons 1946
AGIP (Venice)	600,000	
ROMSA (Fiume	120,000	20,000
RIOT (Vado Ligure)	50,000	30,000
ANIC (Bari)	180,000	150,000
Socony-Vacuum (Naples	250,000	150,000
Standard Oil (Triesta)	80,000	30,000
ANIC (Leghorn)	190,000	Destroyed
Royal Dutch Shell (La Spezia)	300,000	100,000

The Italian government has been giving close attention to the matter of oil supply. As soon as the oil department of the AMG transferred control of the various occupied districts to the civil administration the activities which had been in its charge were turned over to the Liquid Fuel Department of the Ministry for Industry and Commerce and to the Comitato Italiano Petroli. The import program set up for 1946 contemplates receipt of the following quantities of products:

Products	Total Imports Tons	UNRRA's Share Tons
Gasoline	345,000	200,000
Kerosene & gas oil	500,000	240,000
Fuel oil	900,000	420,000
Lubricating oil	86,000	36,000
Petroleum coke	39,000	6,000
Asphalt	110,000	87,000
Paraffine and vaseline	33,000	5,000

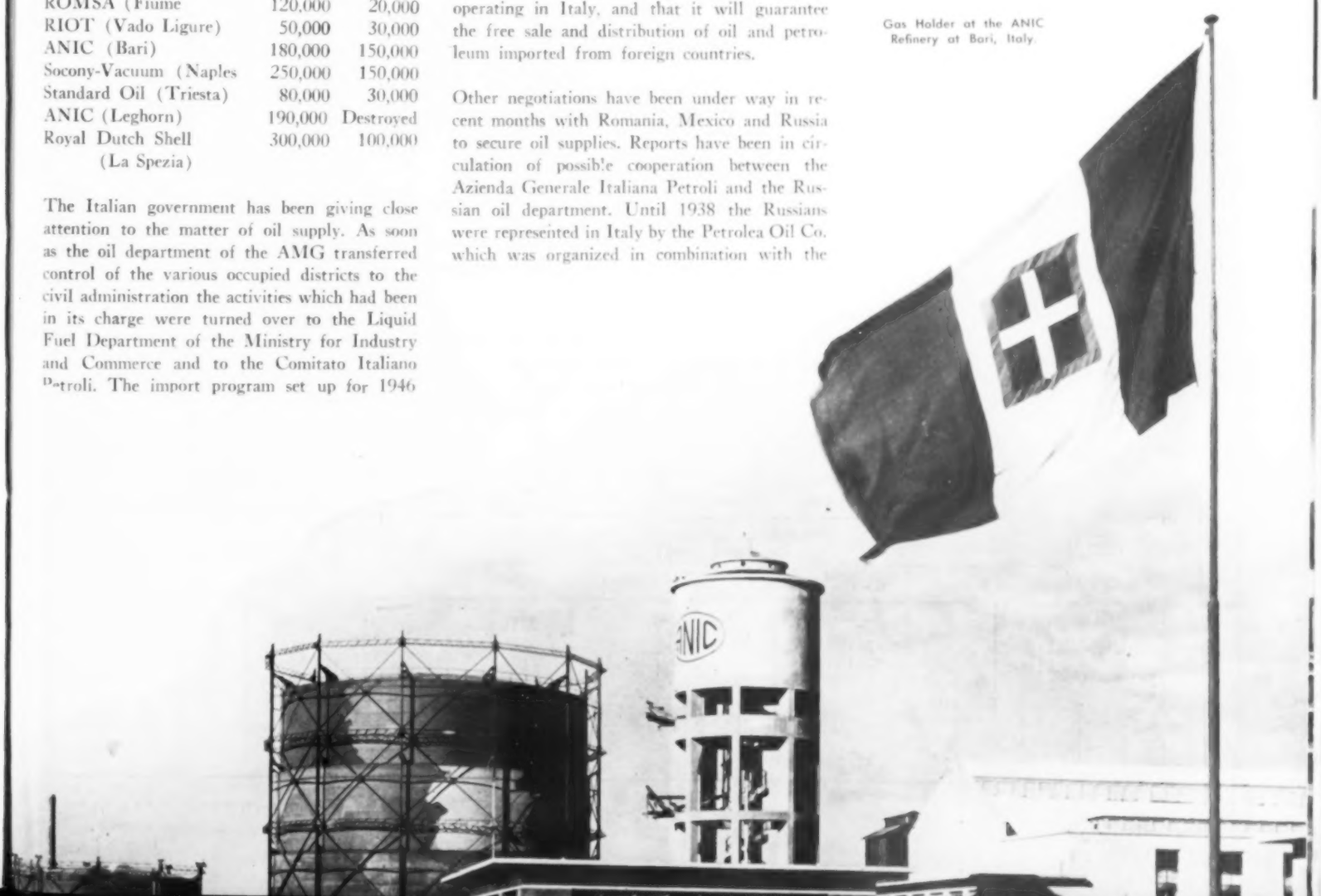
It is evident that these quantities will not cover the requirements of the Italian market even with reduced transport activities above referred to. Consequently, the government must look beyond the agreements with foreign governments and with the UNRRA to meet its full needs. However, the country's uncertain position has prevented it from outlining an official oil policy. The government has entered into discussions in London and Washington looking to the return to their owners of refineries belonging to subsidiaries of the Standard Oil Co., Socony Vacuum and Royal Dutch Shell which were seized in June 1940, and upon the Allied military occupation were taken over by the Allied forces. By this action it is hoped to speed up their reconstruction. At the same time the government is prepared to give assurances that no protectionistic steps will be taken against foreign concerns operating in Italy, and that it will guarantee the free sale and distribution of oil and petroleum imported from foreign countries.

Other negotiations have been under way in recent months with Romania, Mexico and Russia to secure oil supplies. Reports have been in circulation of possible cooperation between the Azienda Generale Italiana Petroli and the Russian oil department. Until 1938 the Russians were represented in Italy by the Petrolea Oil Co. which was organized in combination with the Fiat Automobile Co. The Petrolea Company at one time operated a refining plant at Vado Ligure and had a concession for distribution of oil and petroleum products along roads in northwestern Italy.

The question of oil supplies also has a bearing on the problems of water and air transport. The first is involved through the Anglo-American agreement regarding reconstruction of the Italian mercantile marine, and the second by the agreement signed in Rome between the government and the Transcontinental and Western Air Company providing for the creation of an Italian subsidiary concern to operate civil air services in this country.

Considering that Italy in order to pay for imports of coal from Belgium and France has agreed to send to those countries 30,000 miners whose remittances will be used for the above payments, and that Italian labor has been engaged by the Arabian American Oil Company for work in Saudia Arabia it might conceivably be possible to arrange payment for oil supplied by American and British oil companies through the compensation paid by these companies to Italian labor, to the Italian mercantile marine and to Italian shipbuilders for services which they are prepared to render.

Gas Holder at the ANIC Refinery at Bari, Italy.



Exploratory Drilling in 1946*

By Frederic H. Lahee†

In the 30 principal oil states covered by this review a total of 23,030,266 feet was drilled during 1945 in 5613 exploratory holes. These included 1214 producers with a total depth of 5,501,702 feet and 4399 dry holes with a footage of 17,528,564. This means that 21.6 percent of the holes drilled and 23.9 percent of the footage were productive. One producer foot was drilled for every 3.19 feet of dry hole. One successful well was drilled for every 3.62 dry holes. The average depth of hole was 4103 feet.

In the eight states of the southern district (see map) a total of 13,452,603 feet was drilled in 2,706 holes. Of these 613 with a footage of 3,508,301 were producers and 2093 totaling 9,944,302 feet were dry holes. In this area 22.7 percent of the holes drilled and 26.1 percentage of the footage were productive. One successful well was drilled for every 3.41 dry holes. The average depth was 4971 feet. For comparison with the results obtained in this area during the seven preceding years see Table I.

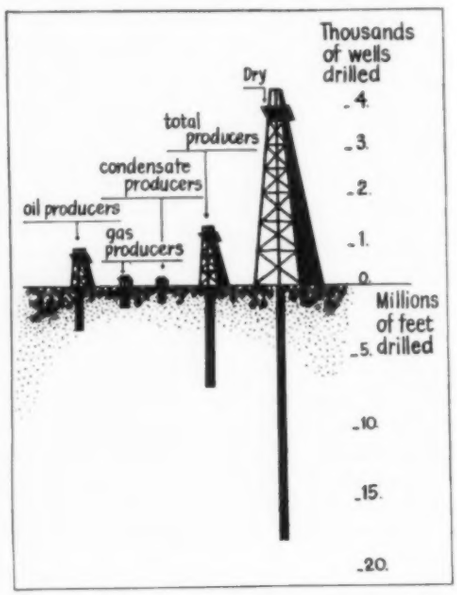
Selection of the location for a wildcat well may be based on geology (surface geology, sub-surface geology, trend along known structural or stratigraphic conditions, local or regional, or shallow exploratory drilling); or it may be based on geophysics (exploration by seismograph, torsion balance, gravity meter, magnetometer, et cetera); or it may be based on some non-technical suggestion or requirement, such as "creekology," "hunch," "doodlebug," promotion, lease obligation, reported showing of oil or gas in holes previously drilled, et cetera. In many cases a block of acreage is taken on trend, or gravity exploration, or magnetic exploration, and subsequently the well is located within the block by some more detailed work, such as seismic exploration. We believe that in such cases credit should be given to both the reconnaissance method and the detailed method of exploration. Sometimes the reason for choosing the location cannot be ascertained, and it is then recorded as "unknown".

Using the best information available from men familiar with such statistics, each in his own state or district, it is estimated that 115 exploratory wells drilled on technical advice (geology or geophysics) were successful, and 3697 were dry; 47 holes, located for non-technical reasons, were producers, and 404 were dry; 52 producers and 298 dry holes were located for reasons unknown. These figures show that 23.2 percent of the holes drilled on technical advice were producers as contrasted with 10.4 percent successful in the case of the holes located without technical advice. Therefore, in 1945, locations based on technical recommendations were 2.2 times as successful as those drilled without such advice. Table I shows the basis for locating exploratory wells in 17 states year by year since 1938.

Comparing 1945 figures with those for the preceding year, we note the following:

(1) There was a long increase in exploratory drilling in the United States, amounting to an increase of 17 percent of holes drilled in 1944, and nearly 14 percent of exploratory footage drilled in 1944.

(2) There was an increase in exploratory drilling in most of the states, but the number of holes remained nearly the same in 1945 as in 1944 in Kentucky, Louisiana, and Michigan, and there was a decrease in exploratory holes drilled in Arkansas.



(3) The average depth of hole decreased from 4,217 feet to 4,103, for the country as a whole.

(4) In six states (California, Indiana, Montana,

*Condensed from a report presented before the American Association of Petroleum Geologists.
†Chief Geologist, Sun Oil Company.

TABLE I

Summary of Statistics on Basis for Locating Exploratory Holes in 17-States Area

Year	Geology		Geophysics		Geology and Geophysics		Sundry Non-Technical		Unknown		Totals		Grand Total
	Prod.	Dry	Prod.	Dry	Prod.	Dry	Prod.	Dry	Prod.	Dry	Prod.	Dry	
1938	192	1039	78	251	31	67	44	535	24	372	369	2264	2633
1939	140	1100	69	393	13	40	43	662	10	201	275	2396	2671
1940	195	1195	100	443	22	79	35	770	11	131	363	2618	2981
1941	300	1357	143	432	28	111	29	755	2	61	502	2716	3218
1942	305	1418	110	484	42	134	22	575	11	79	490	2690	3180
1943	405	1813	147	538	65	242	21	480	6	71	644	3144	3788
1944	568	2014	145	643	102	263	58	672	5	80	878	3672	4550
1945	771	2733	142	543	140	313	29	353	22	236	1104	4178	5282

TABLE II

Summary of Statistics on Proved Reserves and Exploratory Drilling in 17-States Area

Year	A. Proved Reserves as of Jan. 1 (1000's of Bbls.)	B. Proved Reserves as of Dec. 31* (1000's of Bbls.)	C. Net New Proved Reserves (1000's of Bbls.)	D. Production During Year (1000's of Bbls.)	E. Gross New Proved Reserves (C + D) (1000's of Bbls.)	F. Total Exploratory Footage (Feet)	G. New Proved Reserves (E) per Exploratory Foot Drilled (Bbls.)	H. Total Number of Exploratory Holes Drilled	I. New Proved Reserves (E) per Exploratory Hole Drilled (Bbls.)
1938	15,102,239	17,056,370	1,954,131	1,183,733	3,137,864	8,830,166	355.3	2633	1,191,744
1939	17,056,370	18,186,767	1,130,397	1,235,013	2,365,410	8,729,052	270.9	2671	885,589
1940	18,186,767	18,688,777	502,010	1,322,794	1,824,804	10,055,499	181.5	2981	612,161
1941	18,688,777	19,270,869	582,092	1,375,411	1,957,503	11,534,731	169.7	3218	608,298
1942	19,270,869	19,792,818	521,949	1,355,102	1,877,051	12,050,366	155.7	3180	590,267
1943	19,792,818	19,759,516	-33,302	1,475,881	1,442,579	14,950,309	96.5	3788	380,828
1944	19,759,516	20,171,588	412,072	1,653,453	2,065,525	19,418,752	106.0	4550	453,961
1945	20,171,588	20,566,405	394,817	1,713,725	2,108,542	21,963,026	96.0	5282	399,194

* This figure happens to be 98 per cent of the total proved reserves of the United States as of the same date each year.

New Mexico, Ohio, and Oklahoma) the average depth of hole increased, but in all the other 11 states where more than 25 exploratory holes were drilled in 1945, there was a decrease in the average depth per hole.

In former annual reports we have studied conditions in a group of 11 selected states. In the general review of all our previous reports, printed late last year, we compared statistics for a group of 17 states. Each year, from 1938 to 1945 inclusive, these 17 states have included 98 percent of the proved oil reserves of the country. For this reason their study gives essentially a picture of conditions in the United States where we went to compare exploration activities and additions of new oil from year to year.

Using round numbers for averages we might say that new-field wildcats constitute about 60.4 percent of all the exploratory holes drilled; outposts about 18 percent; new-pool wildcats about 15 percent; deeper-pool tests about six percent; and shallower-pool tests about six-tenths of one percent. Together, then, the new-pool tests (the last three) would constitute 21.6 percent of the total. Or, putting this in still more general form, we may say that exploratory drilling is roughly divisible into 60 percent wildcatting for new fields, 20 percent drilling for new pools on structures already producing, and 20 percent outpost drilling for long-distance extensions of pools already partly developed.

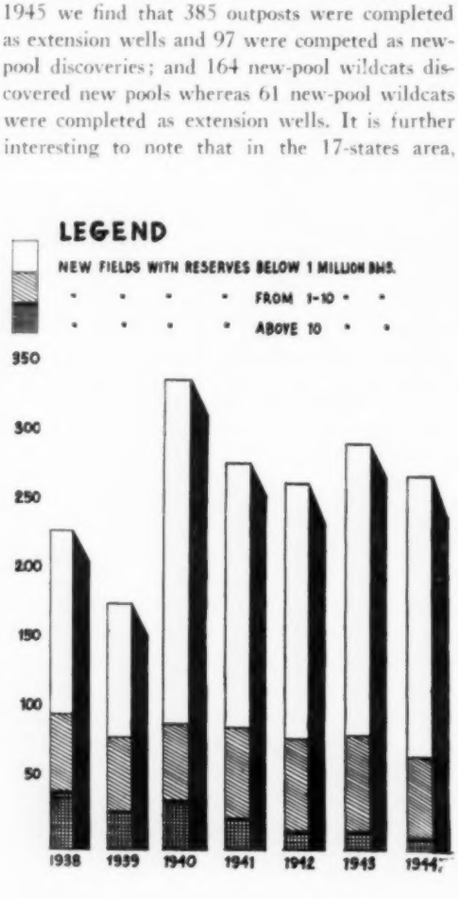
In 1945, in the 351 successful new-field wildcats, 1,789,392 feet were drilled, and 11,579,395 feet were drilled in the 2685 dry new-field wildcats. Analogous figures, in 1944, were 1,640,473 feet drilled in the 342 successful new-field wildcats of that year and 11,417,643 feet drilled in the 2752 dry new-field wildcats. These figures indicate that in new-field wildcats in the country as a whole, the average depth was 4220 feet in 1944 and 4403 feet in 1945".

Although, since 1940 (with the exception of 1942) there has been an increasing number of successful exploratory holes, nevertheless, in that same period the percentage of new-field discoveries has steadily decreased. In 1945 this percentage was less than half what it was in 1940. Significant also is the fact that, since 1939, there has been apparent an improvement in the producer-dry-hole ration from 8.71 dry holes per producers to 3.78 dry holes per producers, and from 6.80 feet drilled in dry holes for each foot in producers to 3.56 feet drilled in dry holes per foot in producers. In other words exploratory drilling has been increasingly successful in finding new oil and gas (we are not referring here to quantity) in outpost drilling and in new-pool drilling, but it has been decreas-

ingly successful in finding new oil and gas in new-field, "rank wildcat" drilling.

In Table II are listed annual statistics comparing the American Petroleum Institute's figures on proved oil reserves* with our figures on exploratory drilling. This comparison is suggestive, but it is not quite precise, and for this reason: The estimated "new proved reserves" (Cols. C and E) include, for each year, newly discovered proved reserves and also new proved reserves resulting from extensions of pools of fields previously discovered. This new oil by extensions is very largely a result of regular field development, not of exploratory drilling. In fact, some study of this matter leads us to conclude that probably not over two percent, certainly not over five percent, of the new proved reserves added by extensions in any given year is attributable to exploratory drilling. It is nearly all to be credited to field development drilling. However, this "extension oil", each year, is really a follow-up of the discoveries of several preceding years. In this sense certain fractions of it might be credited to years gone by, but this would involve many serious difficulties. We believe that it is better to refer to the simpler picture as presented in Table II, keeping in mind that Columns G and I do not actually measure the results of the exploratory effort for any given year.

A hole may be located as an outpost with the intention of trying to extend a pool partly developed, but instead it may discover a new pool; and, similarly, a new pool wildcat may be located in search of a new pool because it is believed to be well outside the limits of the known pool, but instead it may end up by extending this known pool farther than had been expected. A majority of outposts, if successful, are completed as extension wells and a majority of new-pool wildcats, if successful, discover new pools. In 1945 we find that 385 outposts were completed as extension wells and 97 were competed as new-pool discoveries; and 164 new-pool wildcats discovered new pools whereas 61 new-pool wildcats were completed as extension wells. It is further interesting to note that in the 17-states area,



335 new fields and 376 new pools were discovered in 1945, as compared with 384 extensions*, and that in the entire country there were 351 new-field discoveries and 408 new-pool discoveries, compared with 446 extensions.

A question sometimes asked concerns the approximate percentage of true wildcatting (new-field wildcatting) by major companies, on the one hand, and by minor companies and independents, on the other hand. Distinction between these three classes of operator is not always easy, and in some instances the same company may be regarded as a "major" in one district, but as a "minor" in another district. Our statistics showed that in the country as a whole, 894 new-field wildcats (158 producers and 736 dry holes) were drilled by majors; 1854 new-field wildcats (165 producers and 1689 dry holes) were drilled by minors and independents; and 288 new-field wildcats (28 producers and 260 dry holes) were drilled by minors or independents with the drilling financed by major companies. Corresponding figures for the 17-states area were 843 new-field wildcats (150 producers and 693 dry holes) by majors; 1783 new-field wildcats (157 producers and 1626 dry holes) by minors and independents; and 287 new-field wildcats (28 producers and 259 dry holes) by minors and independents with the drilling financed by majors.

Our committee has made a re-appraisal of the fields discovered in the six years 1938-1943, in the 17-states area, and has added estimates of the total ultimate reserves for the new-field discoveries of 1944 in the same area. Table III presents these estimates which were made as of January 1, 1946. As a result of the re-appraisal a few fields were dropped from the list because they were gas fields. Among the 1566 discoveries made in the 6-year period, the estimates were raised in 85 cases and lowered in 13 cases, a comparison which suggests that these estimates were definitely on the conservative side.

*Totals of the reserves figures published by API each year for the 17 states.

*The new-pool discoveries referred to in this paper are all the result of exploratory drilling. In addition to these, at least 45 new pools were discovered in the drilling of field-development wells. These included 13 discoveries of gas and 32 of oil. Probably there were more, but this year we do not have complete statistics on this phase of the subject.

TABLE III

Number of Fields Discovered Each Year in 17-States Area, Grouped According to Estimated Total Ultimate Reserves.

Year	Reserves Group *					Total A-E, incl.	Percentage of A + B + C fields in totals fields
	A	B	C	D	E		
	Number of Fields Discovered in Year Indicated						
1938	9	10	21	55	131	226	17.7
1939	5	1	16	46	103	171	12.8
1940	3	8	20	56	149	336	9.2
1941	4	3	13	63	197	280	7.1
1942	1	3	10	53	195	262	5.3
1943	1	1	12	56	221	291	4.8
1944	3	1	4	62	198	268	3.0

*** In these estimates of total ultimate reserves, made as of Jan. 1, 1946,**
A means 50 million or more barrels
B means between 25 million and 50 million barrels
C means between 10 million and 25 million barrels
D means between 1 million and 10 million barrels
E means less than 1 million barrels.

Oil's Share in Lend Lease $2,300 Millions

An approximate measurement of the support extended by the United States to the war effort of other members of the United Nations in the form of petroleum products is provided by figures of lend lease shipments which have been compiled in Washington. These statistics cover supplies furnished for March 1941 to V-J Day in 1945. They are not the final accounting figures which are still being checked but they are considered to be virtually complete by lend lease officials who have found that their operating reports agree very closely with the accounting records.

According to these computations lend lease shipments of petroleum products from the United States and offshore areas during the period mentioned amounted to 510,174,803 barrels valued at $2,300,819,995 at average prices. The chief recipients were the United Kingdom, other members of the British Commonwealth and Russia.

Of the totals 430,985,491 barrels of crude and products valued at $3,807,478,997 went to the United Kingdom; 42,445,259 valued at $206,995,267 went to Australia and New Zealand; 18,421,024 valued at $160,879,950 went to India; 15,284,482 valued at $103,588,549 went to Russia; 3,038,548 valued at $21,877,232 went to all other countries and possessions.

Motor gasoline was the product exported in the largest quantity — 152,161,636 barrels, valued at $622,837,819. Diesel oil was second in quantity with 137,237,736 barrels valued at $306,311,251. Aviation gasoline came next with 119,555,723 barrels valued at $839,522,654.

Table I gives a break-down of exports as to product, destination and value. Although the United States made every effort to utilize its great refining capacity most effectively for the benefit of the nations with which it was joined in the war, the country actually exported to all countries a smaller quantity of petroleum products than was exported before the war. It used for its own war industries and armed forces at home and abroad about 88 percent of the oil produced. Other members of the United Nations made the most effective use possible of their petroleum production and refining facilities — limited though these were as compared with those of the United States. A considerable part of the overseas petroleum requirements of the country's naval, air and ground forces, and merchant marine was supplied by these allies under reverse lend-lease. Operating figures on reverse lend-lease and reciprocal aid are shown in Table II.

It is pointed out that a substantial part of the petroleum products shown as lend-lease exports were returned to United States armed forces abroad. In addition, large quantities of petroleum products were furnished to these forces under reverse lend-lease by allied nations from their own petroleum resources.

TABLE I

LEND LEASE EXPORTS PETROLEUM PRODUCTS

March 1941 — August 1945
(Bbls. of 42 U. S. gallons)

	United Kingdom	Australia & New Zealand	India	Russia	All Other Possessions	Grand Total
Aviation Gasoline ..	86,638,674	12,638,550	14,784,308	5,198,348	295,843	119,555,723
Motor Gasoline	134,794,760	15,152,975	6,984	1,855,429	351,488	152,161,636
Kerosene	21,529,410	1,763,343	39,464	111,610	34,493	23,478,320
Diesel	125,717,021	8,503,189	706	1,751,308	1,265,512	137,237,736
Lube Oil General	7,249,154	2,961,018	2,348,373	260,254	738,480	13,557,279
Lube Oil Aviation ..	7,523,053	170,971	686,418	314,163	158,543	8,970,148
Grease and Wax	1,096,649	137,230	84,904	44,772	137,466	1,501,021
Other Petroleum Products	5,205,722	1,117,654	435,386	5,631,588	56,680	12,447,030
Crude Oil	41,231,048	328	34,481	10	43	41,265,910
Total	430,985,491	42,445,258	18,421,024	15,284,482	3,038,548	510,174,803

TABLE II

Value of Lend Lease Exports Petroleum Products

March 1941 — August 1945
(Bbls. of 42 U. S. gallons)

	United Kingdom	Australia & New Zealand	Russia	India	All Other Countries	Grand Total
Aviation Gasoline	$608,118,408	$ 82,514,615	$ 35,799,003	$111,221,283	$ 1,869,345	$ 839,522,654
Motor Gasoline	567,748,083	46,828,835	6,773,664	49,190	1,438,047	622,837,819
Kerosene	46,937,491	3,418,065	355,552	109,193	119,710	50,940,011
Diesel	281,087,194	17,175,300	5,775,987	1,570	2,271,200	306,311,251
Lube Oil General	103,086,452	44,720,171	4,083,913	34,853,565	10,771,846	197,515,947
Lube Oil Aviation	114,908,304	2,703,657	6,786,360	10,740,780	2,186,651	137,325,752
Grease and Wax	16,973,804	2,284,850	702,059	1,343,637	2,082,844	23,387,194
Other Petroleum Products	21,622,426	7,349,279	43,311,954	2,399,637	1,137,524	75,820,820
Crude Oil	46,996,835	495	57	161,095	65	47,158,547
	$1,807,478,997	$206,995,267	$103,588,549	$160,879,950	$21,877,232	$2,300,819,995

O'Mahoney Urges Oil Search

In a recent letter to Secretary of Interior Krug urging his support of broader incentives for drilling on public lands, Senator O'Mahoney gave some inkling of what may be one of the main recommendations in the forthcoming report of the Senate Special Petroleum Committee, of which he is chairman. The committee was created to recommend a domestic and a foreign oil policy.

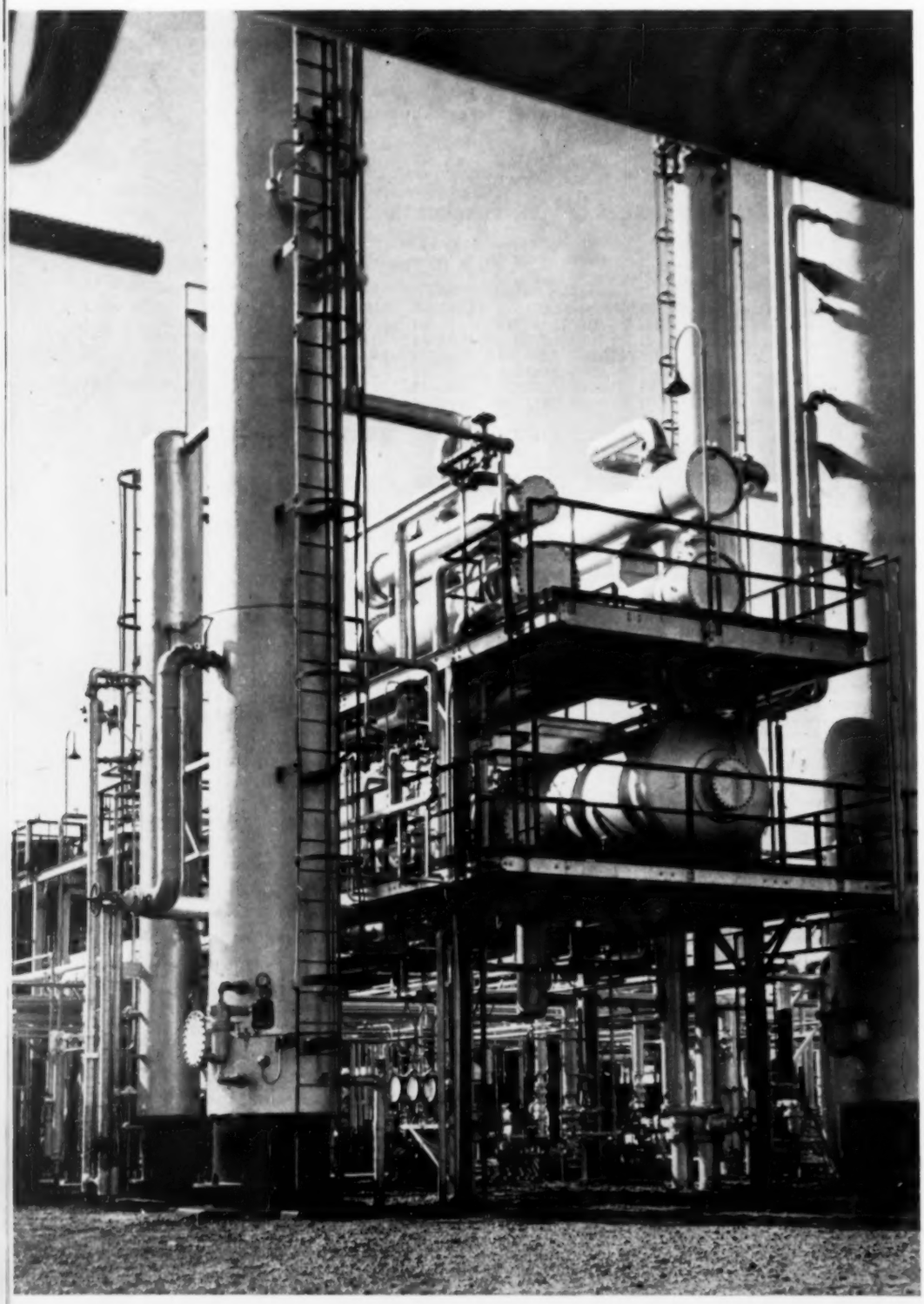
Senator O'Mahoney points out that the "center of gravity" in oil production is being shifted from the Western Hemisphere to the Eastern, and that this shift of balance is one of the most important facts of our time. "It is the cause of the principal international disturbances which have made the establishment of the United Nations such a difficult and complex task," he says. "Iranian and Arabian oil explain the conflicts in the Near East in which Russia and Britain and certain American companies are involved."

Russian negotiations involving Iran, the Senator observes, give reason to fear that unless the United Nations successfully surmounts its present difficulties American and British operations in the Near and Middle East "could turn out to be an investment in Armageddon."

"To assume in these circumstances", he declares, "that we should now proceed with respect to the development of the public lands as though we were in normal times . . . seems to be in complete disregard of the plainest of plain facts. The United States cannot now fail to do everything in its power to promote the search for new oil deposits within its own boundaries, so that come what may upon the international scene, it will not be dependent upon any foreign sources of oil. We cannot afford to risk either industrial or political leadership and both are closely associated with the maintenance here in the United States of ample oil reserves."

ABSORPTION PLANT
Saves 30 Million Feet of Gas

Absorbers and Condensers. All Photographs with this Article by Elwood M. Payne, Houston.



Designed specifically for the purpose of collecting flare gas from almost 200 oil and gas wells located on 85 leases in the area, the Glen H. McCarthy gasoline absorption plant in Winne, Jefferson County, Texas, was opened officially in March of this year.

This plant is an example of the conservation of petroleum resources through voluntary action on the part of the industry. Since the plant has been placed in operation gas flares have been virtually eliminated in Winnie, Stowell, Fig Ridge, and Fannette fields. The new McCarthy plant is the largest privately financed new industry in the Sabine-Neches District of Texas in the past twenty years.

The plant has a capacity of 85 million cubic feet of gas daily, including 30 million cubic feet of casinghead, or low pressure gas, and 55 million cubic feet of high pressure gas gathered from gas and gas distillate wells from the four fields mentioned.

Originally planned as part of the wartime program for the production of isobutane and isopentane to meet heavy military demands for aviation gasoline, construction of the plant was begun in January 1945 and it got into full production early in the current year. It was designed and built by Stone and Webster Engineering Corporation.

The plant is feed by a gathering system of gas pipe lines ranging from four to 30 inches in diameter laid by the J. R. Harrigan Construction Company, and serving an area extending from Fig Ridge, nine miles south of the plant, to Fannette, four miles to the east. Prior to the erection of the plant the 30 million cubic feet of casinghead gas was flared. This casinghead gas is now utilized to supply the lines of the Jefferson Pine Line Co., an affiliated McCarthy Company. The 30 million cubic feet of gas represents the heat equivalent of 5,000 barrels of oil daily, and is in addition to 40,000 gallons of liquid products processed daily.

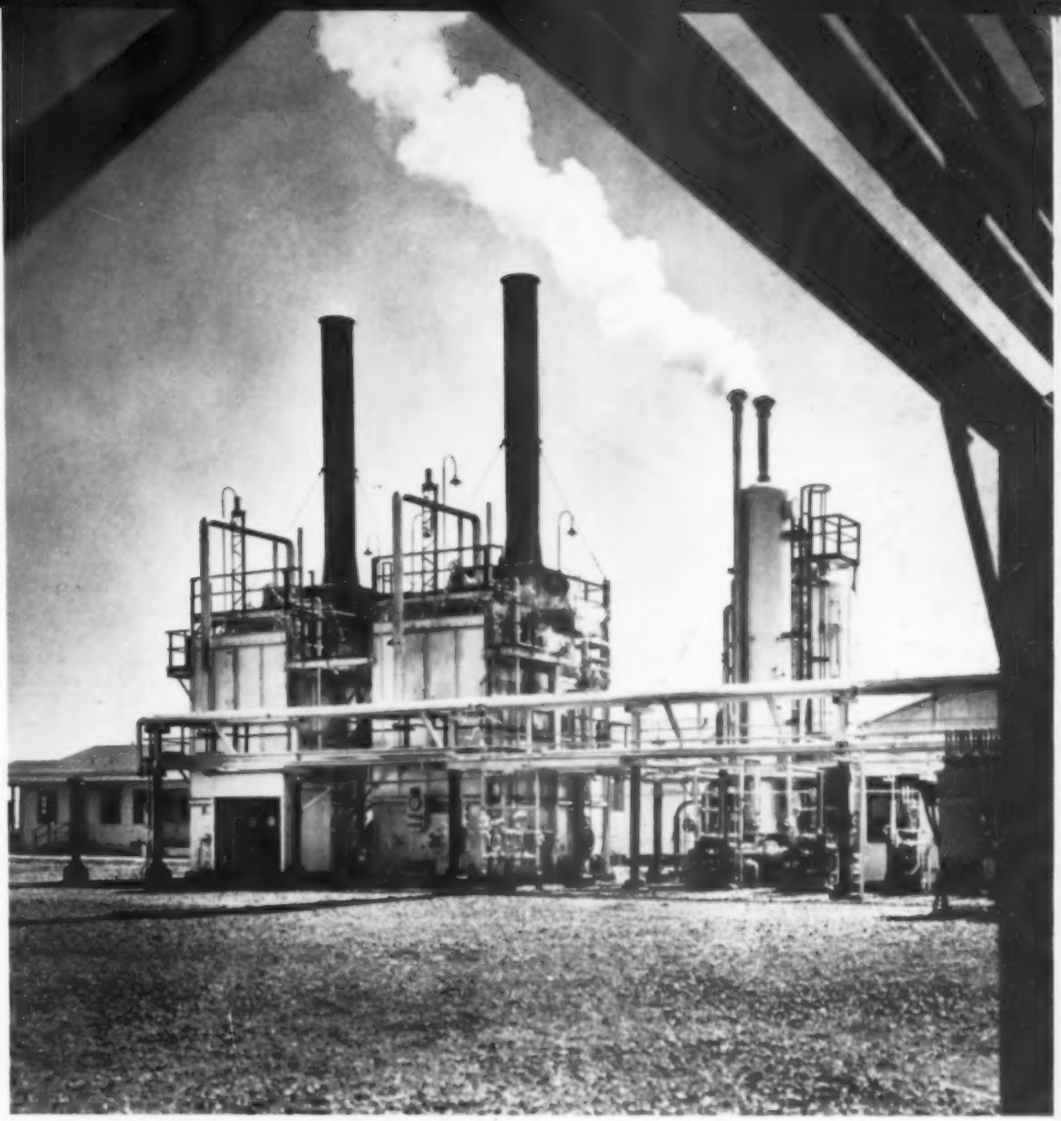
By processing the gas the plant produces propane liquified petroleum products including butane, gasoline, kerosene and diesel fuel, in addition to dry residue gas.

Outlets for dry residue gas from the McCarthy plant at present include the Beaumont Natural Gas Company, another McCarthy affiliated company; the Neches Butane Company, which serves the synthetic rubber plant at Port Neches; the

Texas Public Service Company, which supplies gas to the city of Port Arthur; the Gulf States Utilities power station which provides electric power for a large area of the Gulf Coast of Texas and Louisiana and domestic outlets in Port Neches and Nederland. Among the future major consumers to be served are the DuPont plants in Orange.

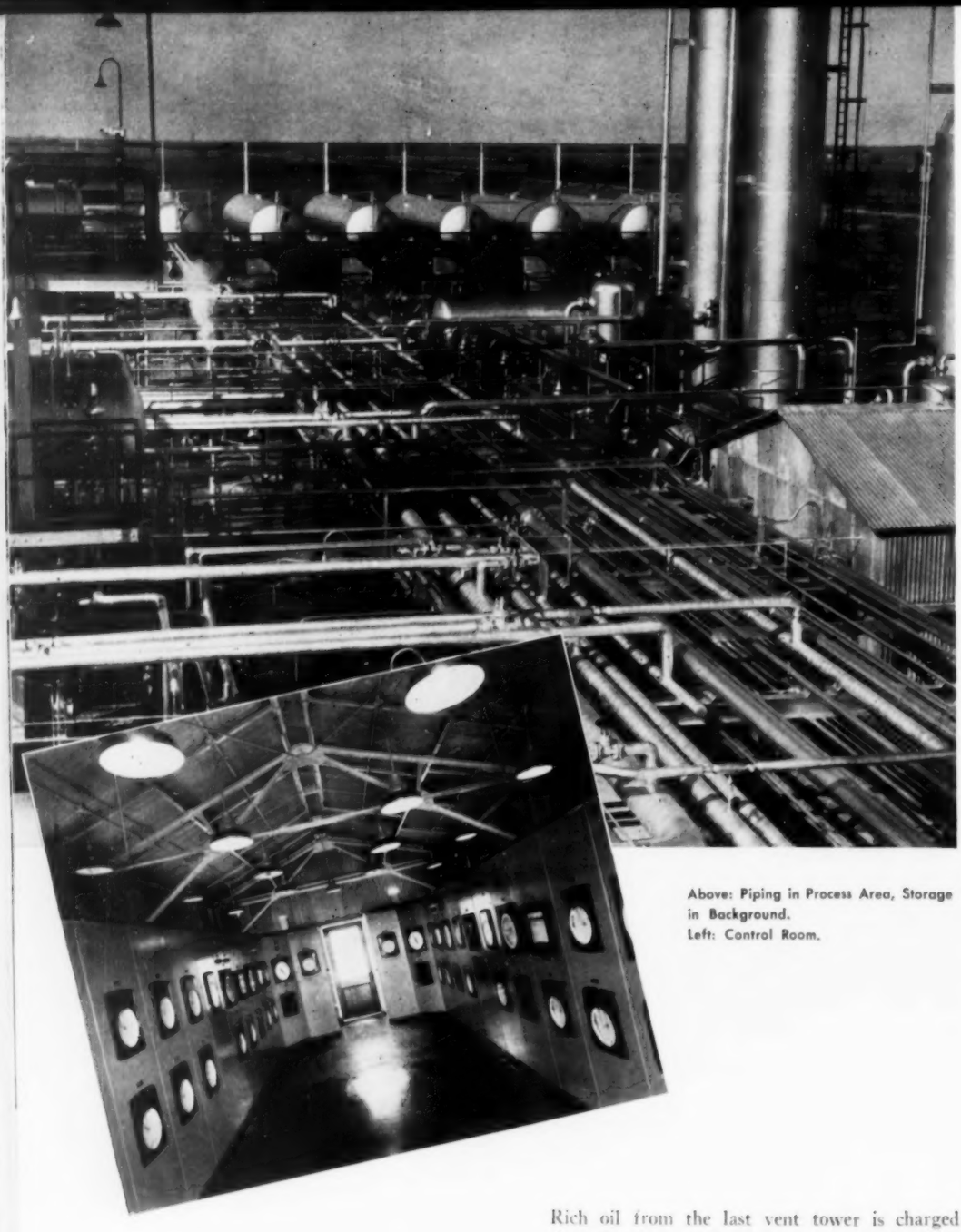
The gasoline absorption plant includes a large compressor house which houses ten 800 H.P. compressors which compress the incoming low pressure gas from 12.2 psi to 450 psi gage in three stages; two large stationary boilers, two stills, one for distillation and the other for rich oil; both high and low pressure absorbers and vents and five large towers for extracting isopane, isobutane, butane, propane and ethane. Gas absorption is carried out in two 22 plate absorbers; 825 psi gage gas from the plant separator system is charged direct to one absorber and then flows to one of the 10 in. natural gas transmission lines; 450 psi gage gas from the compressors is charged to the other absorber, flowing then to the other 10 in. natural gas line.

An interesting feature of the absorpton oil system is the economy of oil circulation effected by the use of high pressure absorption oil from the 825 psi gage absorber in the lower section of the 450 psi absorber. The high pressure rich oil flashes as it enters the mid-section of the absorber, losing considerable methane and undesirable constituents. It is further dementhanized in the lower section by contact with the rich low pressure gas. At the same time, its propane and butane content are increased. Final stripping of the low pressure gas and vent gas is accomplished in the upper section of the 450 psi gage



↑ Boilers and Furnaces

↓ Compressor Room



Above: Piping in Process Area, Storage in Background.
Left: Control Room.

absorber with a stream of lean oil. The total lean oil requirements are reduced approximately 40 percent by this piping arrangement, as compared with separate handling of the high pressure and low pressure rich oil streams.

The low pressure vent and reabsorber consist of a large diameter lower section and a small diameter upper section. The rich oil from the intermediate pressure vent is introduced at the top of the lower section of the low pressure vent. A flash takes place at the entrance to the vent and the rich oil absorbs vent ethane and propane from the rich low pressure vent gas which is introduced at the bottom of the lower section. The flashed gas is stripped of butane and propane by a lean oil stream introduced at the top of the upper section. The arrangements of the oil and gas flow in the 450 psi absorber and the low pressure vent achieve high propane recovery with an economical oil circulation.

Rich oil from the last vent tower is charged through a heat exchange system against hot lean oil and then to a vertical gas fired furnace developing 19,700,000 Btu per hour where the rich oil is heated to 450 F. Raw gasoline is stripped from the hot rich oil in a 20 tray still, after which the hot lean oil is cooled and flows to the surge tank. The use of a direct-fired heater allows the use of a high oil temperature. The still operates at high pressure because of the large quantity of propane and butane recovered.

Raw gasoline is charged to an ethane tower through two 14 stage vertical centrifugal pumps, operating at 550 psi gage discharge pressure. The de-ethanized product enters a propane tower, and commercial propane is produced as an overhead liquid product. Stabilized natural gasoline or motor fuel can be produced as bottom product from the butane tower. Overhead butanes can be further split in an isobutane tower. As an alternate operation, bottoms from the butane tower can be charged to an isopentane column for production of an overhead isopentane column for production of an overhead isopentane cut and a stabilized motor fuel bottoms product suitable for leading.

The condensate from the high pressure wells after stage flashing is charged to a low pressure fractionating tower operated in accordance with refinery practice. A gasoline stream is produced as an overhead product and naphtha and kerosene streams can be produced as side stream products using strippers on each side stream.

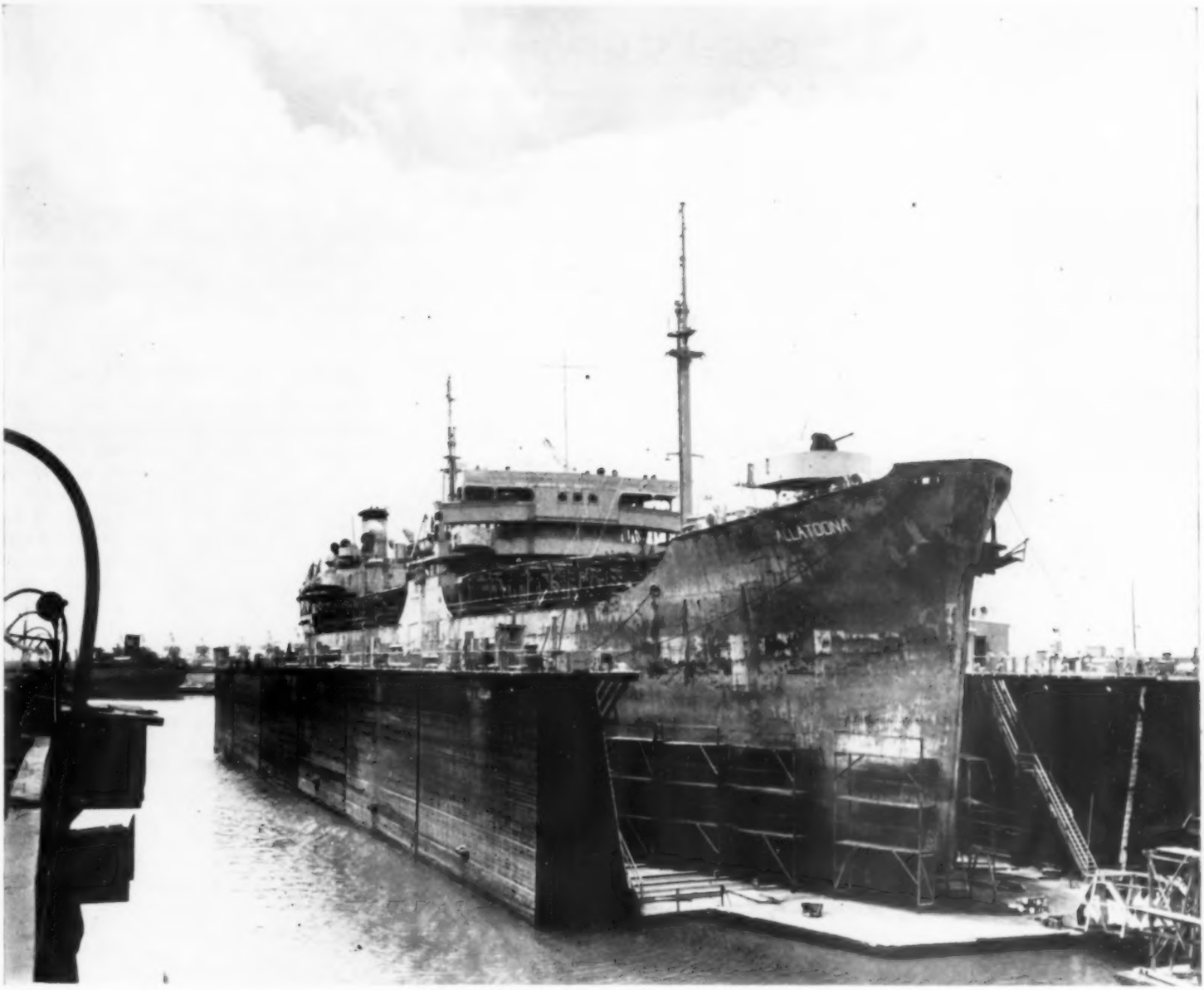
Control instruments for the fractionating area have been centralized in one building. All fractionating towers and related equipment were laid out back to back so as to provide one central operating aisle. Condensers and accumulators were grouped for each pair of towers to economize on structural steel for supporting overhead equipment. All processing equipment is grouped in an area less than ten acres in area, yet ample space has been provided between compressor house, fractionating and storage areas in accordance with usual gasoline plant practice.

Storage facilities at the plant include fifteen 35,000-gallon horizontal products storage tanks and two 5,000-bbl. bolted distillate storage tanks. In addition to large truck loading racks for tank wagons there is a 20-car loading rack on a Santa Fe spur at the end of the plant.

At the opening of the plant Col. Ernest O. Thompson, senior member of the Texas Railroad Commission, petroleum regulatory body of the state, said: "The Railroad Commission of the State of Texas appreciates what you have done here, congratulates you and wishes you well. If there is any possibility of extra allowables on Texas oil wells I believe that we ought to give it to those wells that save the gas as is being done here in this field." Col. Thompson pointed out that there was enough gas saved and utilized by the new absorption plant to supply the domestic needs of natural gas for a city the size of Houston.

The labor of no more than 50 men is required in the collection and processing of the gas that goes through the Winnie absorption plant. The compressor units of the plant boost pressure of the gas up to 450 lbs. before it enters the lines of the Jefferson Pipe Line Co. which serves the outlets. It is noteworthy that only five men are required for the actual operation of the plant on each of the three 8-hour shifts. An engineer can see the entire plant operation from one central control room. There delicate instruments, many of which were developed during the war, record every operation.

In attendance at the Winnie plant opening were state, county and city officials, leading public figures of Southeast Texas, and many land and royalty owners of the area.



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IN THE PICTURES

Drydocking of Tankers like the 524-foot vessel above is done quickly, economically and well at the Brown Yard. At the left, a 72-foot-wide Drill Barge, for operations in bays, rivers and lakes, fits easily in a Floating Dry Dock at the Brown Yard.

Your Tankers will certainly visit the Houston Ship Channel, greatest oil port in the world. You'll find it convenient and advantageous to have them Drydocked or Repaired at the completely equipped Yard of Brown Shipbuilding Co., Inc., located on the Channel at Greens Bayou. Write Box 2634 or call Woodcrest 6-9411 for information.

BROWN Shipbuilding Company, Inc.

AT HOUSTON, TEXAS, GREATEST PORT IN SOUTH

Capital Sidelights on Oil

By W. J. MADDOX, *Chief of World Petroleum Washington Bureau*

Pauley to Far East

California oil man Ed Pauley isn't letting the Senate's rebuff of his nomination for Under Secretary of Navy deter him from public service in other lines. As personal representative of the President in reparations matters, Ambassador Pauley is off for the Far East at the request of the President and the Secretary of State. According to the State Department, he is to "make studies and investigations with a view to recommending co-ordinated and regional programs for the healthy industrial and economic development of Manchuria and Korea, and utilization of their natural resources, in relation to reparations from Japan."

The main purpose of his mission, says Acting Secretary of State Acheson, is to "secure information and make recommendations which would assist the United States government and its allies in planning a program for the Far East which would contribute to the peace and security of the Far East and of the whole world." Mr. Acheson says that China must be enabled to utilize to the full the natural resources and industries of Manchuria, and Korea must be in a position to develop its own, if a long-range plan for the peaceful economy of East Asia is to be worked out.

For State Control of Tidelands

In its report on the tidelands bill filed by Chairman McCarran, the Senate Judiciary committee has given unqualified approval of the move for the Federal Government to quitclaim title to off-shore oil lands. The report was made after extensive hearings on the legislation (H. J. Res. 225, which has already passed the House) and notes that 48 State and local public officials, representing among them 47 States, 417 cities located in all 48 States, 50 public port authorities and other public agencies appeared in support of the resolution, whereas two "private persons and one public official (meaning former Secretary of Interior Ickes) appeared in opposition".

The conclusion of the committee regarding the merits of the legislation was summed up in a single sentence, "that as a matter of sound legislative policy this resolution should pass, as its adoption is the only way to set at rest permanently a controversy which involves titles to property in every State of the Nation."

The committee scoffed at the suggestion that Congress should not act on the tidelands bill because of the litigation pending in the United States Supreme Court. In 54 cases, the committee pointed out, the highest court has upheld state ownership of the lands, and for it now to reverse itself the result would be "so catastrophic" to the economy of the country that Congress would have to step in with new legislation "as a matter of equity" to the property owners. The bill is now on the Senate calendar, but it is doubtful in the present legislative jam if it will be called up before Congress adjorns, probably early in July. If the legislation is not completed by Senate action before the present Congress terminates, then a new bill will have to be introduced and the whole process started from scratch.

Army-Navy Board's New Set-Up

The Army and Navy Petroleum Board, revamped and broadened in its responsibilities and duties, is to be continued as a part of the regular military establishment by the issuance of a charter approved by the Joint Chiefs of Staff. Under the new set-up the board will have direct channels to the Munitions Board and the Aeronautical Board.

Members of the new board are Admiral F. J. Horne, special assistant to the Chief of Naval Operations, chairman; General Leroy Lutes, Commanding General of Army Service Forces; Rear Admiral Ralph E. Jennings, Navy Aeronautics; and General E. M. Powers, supply man of the Army Air Forces. Executive Officer of the board is a man well known throughout the oil industry for his work in petroleum supplies during the war, Colonel G. H. Vogel of the Quartermaster Corps. Secretary of the board is Lieut. Colonel Coleman Romain, who will serve as liaison between the board and the Joint Chiefs of Staff.

Three deputy executive officers will constitute the advisory committee. These are Captain D. D. Biggs, USN, Captain P. P. Blackburn, USN, and Colonel W. J. Worcester, AAF. Functions of the board will be carried out through six divisions: Planning and Programs under Col. O. F. Kotick; Administration, Lt. Col. A. M. Galletly; Technical, Comdr. J. A. Hyland; Supply, Comdr. Carl Drescher; Transportation, Col. M. G. Lassek; and Distribution, Col. B. D. Farnham.

Gold Medal Award To Russell

A noteworthy tribute to Robert Price Russell, president of Standard Oil Development Company, provided a highlight of the annual meeting of the American Institute of Chemists on May 17. The occasion was the award to Dr. Russell of the Institute's gold medal in recognition of his services to the chemical industry and in the war effort. The medal was presented by Dr. Gustav Egloff, president of the Institute, and other speakers were Maj. Gen. Alden H. Waitt, chief of Chemical Warfare Service and Dr. Warren K. Lewis of the Massachusetts Institute of Technology.

Boyd Gets Merit Medal

Bashful Bill Boyd is the recipient of another tribute to his successful guidance of the oil industry through the difficult passages of the war years. This time the President has awarded him the Medal of Merit with a citation which relates that he "directed the industry's participation in the greatest government-industry partnership in the history of the United States. Through his indefatigable efforts, his organizational genius, and his singular ability to harmonize differences and co-ordinate activities, Mr. Boyd contributed materially to one of the outstanding victories of the war, the assurance of petroleum for every military and essential civilian need of the United Nations."

Secretary of the Interior J. A. Krug, presenting the Medal of Merit, highest civilian decoration, to W. R. Boyd, Jr., president of the American Petroleum Institute.

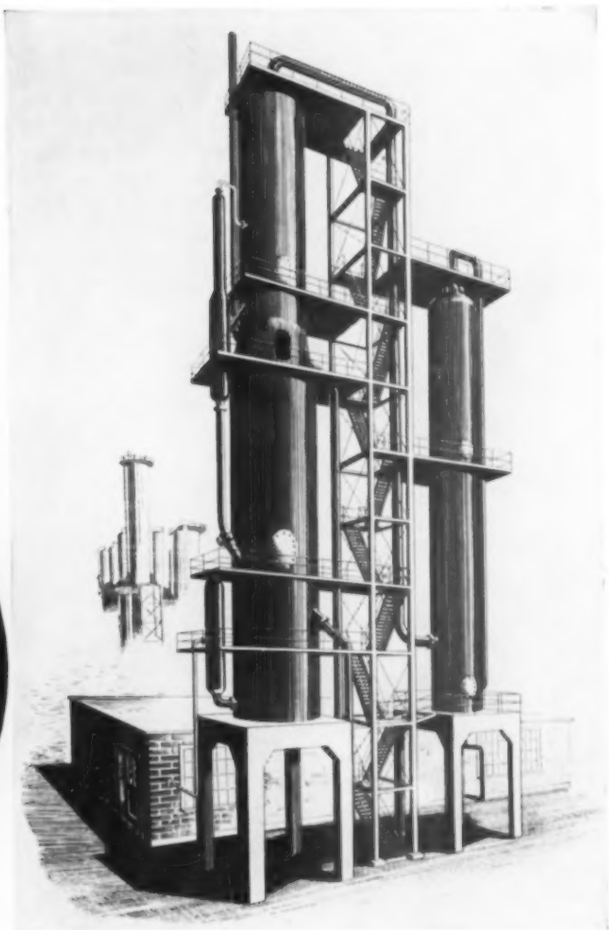
Question:

WHAT IS

Flexibility

IN

CATALYTIC CRACKING ?



Answer:

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- It will process at low temperatures
- It will process at high temperatures
- It will operate for low conversion
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- It can be economically built for the smaller refiner
- It can be economically built for the larger refiner

THAT'S *Flexibility* AND . . .

- It insures *most profits now!*
- It insures *most profits in the future!*

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International News and Notes

Donald Brown,

DONALD BROWN, now chief geophysicist for the Caribbean Petroleum Company of Venezuela, arrived in Caracas early this year to assume his new duties. After graduating in geology in 1925 from Downing College at Cambridge, England, he began a career in the petroleum industry that is of unusual geographic interest. As an employee of the Shell group in 1925, Mr. Brown got his start with the Mexican Eagle Oil Company and remained in Mexico about seven years. In 1932 he was put in charge of geophysical work and, with the exception of an interval during World War II, has followed this phase of the industry ever since.

Six months in Germany, two years in Cuba, a few months in Venezuela, a year in Colombia, almost three years in India and Burma, and a year in the Netherlands East Indies are the industrial milestones of Mr. Brown's career during the years 1932 to 1941. The year 1942 found him in Australia doing research work for war effort. In 1944 he returned to geophysical work, this time in the United States where he remained a year before assuming his present position in Venezuela. During his many years of service in the oil business, Mr. Brown has always been with Shell group.

New Imperial Tanker

A NEW British-built tanker, The "Imperial Halifax," of 5,148 deadweight tons has been added to the Imperial Oil Ltd. fleet, for use in Maritime coastal service, sailing from Halifax to Newfoundland, New Brunswick and St. Lawrence River ports.

The "Imperial Halifax" which was built on the Tyne at Sunderland, has a capacity of 43,000 barrels, an overall length of 358 feet and beam of 48 feet. The speed is 12¼ knots.

The "Imperial Halifax" is the first of five ocean-going tanker the company will acquire to meet immediate shipping needs. During the war Imperial Oil lost four tankers by enemy action. Three were torpedoed — one with the loss of all hands — and one was captured by a German surface raider.

Imperial Offers Scholarships

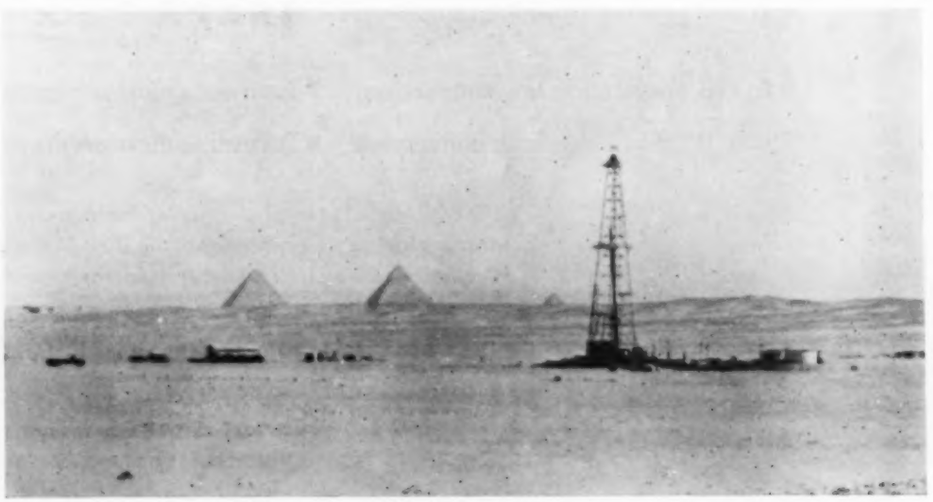
FOUR postgraduate research scholarships and eleven undergraduate scholarships will be awarded annually to Canadian students under a fund established by Imperial Oil Ltd. according to an announcement by Henry H. Heweston, president. Fellowships will be in engineering and geology and holders will be under no obligations to Imperial. Undergraduate scholarships are to be awarded to children or wards of Imperial employees, annuitants or deceased employees. Three-year fellowships are valued at $1,000 per year and four-year scholarships at $500 per year.

Awarded French Contract

CHEMICAL CONSTRUCTION CORPORATION has been awarded a contract by Office National de L'Azote, of France, to design, and furnish the materials and equipment for, a gas reforming plant to be constructed in Toulouse, France. The new plant, utilizing the methane steam process, will convert natural gas, by high temperature cracking, into hydrogen and nitrogen for use in the synthesis of ammonia. It will have a charging capacity of approximately 20,000,000 cubic feet of natural gas daily.

John W. Pertwee,

JOHN W. PERTWEE, who has been employed by the Shell Company for 22 years, has been transferred from Caracas, Venezuela, to the London office. Mr. Pertwee studied at the Camborne School of Mines at Cornwall, England, finishing there in 1923. In 1924, he became a Shell employee and was assigned first to Maracaibo, Venezuela, where he started out as topographer and then became geophysicist. After eight years in that city, he was sent to Mexico to take charge of the company's geophysical work there. This period covered the three years from 1933-1936. Then, early in 1937, he was returned to Venezuela as chief geophysicist, again resident in Maracaibo. In 1940 he was sent to Colombia where he spent two years attending to geophysical operations there and in 1943 he was assigned to Caracas. Mr. Pertwee left for London at the end of March.



Standard Oil Company of Egypt wildcat Abu Roash No. 1, is being drilled near the pyramids of Giza, about ten miles west of Cairo. Photo courtesy Emsco Derrick & Equipment Co.

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SHIPBUILDING
AND DRY DOCK
COMPANY
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Oil Company Staff Changes

F. A. Leovy

J. A. Walker

F. A. LEOVY, vice chairman of Gulf Oil Corporation, retired on May 1st after 42 years with the company. He began his activities with Gulf companies at Beaumont, Texas in 1904 and held many responsible positions in the production and pipe'ine departments in Texas and Oklahoma. In 1914 he was transferred to Pittsburgh where he has directed production and pipeline activities of Gulf companies in the United States and abroad.

During Mr. Leovy's association with Gulf it has grown from a small producing, refining, and transportation operation in Texas and Oklahoma to a completely integrated oil business, with extensive pipe'ines, refining and marketing operations in the United States and foreign countries.

HARRY CAMPBELL has been appointed manager of the marine department of Sinclair Refining Company, and will be a vice president of the company. He succeeds Capt. J. G. Johnson, who has retired. Mr. Campbell was graduated from Annapolis with the class of 1907 and has been with the Sinclair Company for twenty-three years.

JOSEPH E. BLUDWORTH has been made director of petroleum chemicals research for the Celanese Corporation which is starting up a large chemical plant at Bishop, Texas, utilizing C_3 and C_4 hydrocarbons as raw materials. Kenneth D. Bowen is manager of the new plant.

DR. WALTER MILLER, who on March 1st retired as vice president in charge of manufacturing for Continental Oil Company, has been retained by Universal Oil Products Company as a consultant on refining techniques and operations.

J. A. WALKER has been appointed manager of the credit department of Standard of California succeeding H. E. Hartline, who is retiring after after 27 years with the company, the past 14 as department manager. Walker joined Standard as a credit clerk in 1921. Since then he has held every position up the organizational ladder in the credit department and was appointed assistant manager in 1943.

RICHARD W. REINHART, formerly assistant in charge of eastern sales research for, Socony-Vacuum Oil Company, Inc., has been made manager of the company's national market research department. Mr. Reinhart has been with the company for 19 years. He began in 1927 as a service station operator in Buffalo. After rising through many district positions, he came to New York City in 1938 as assistant sales promotion manager.

T. S. JOHNSON has been appointed manager of the Marine Dept. of Imperial Oil Limited. He has been in marine operations since 1928 when he joined Standard Shipping Co. In 1941 he became assistant manager of Lago Oil & Transport Co. He was loaned to Standard Vacuum Company in 1942 as assistant marine operations manager. Subsequently he studied Magdalena River operations in Colombia returning to Canada in 1945 as assistant manager of the Imperial marine department.

E. K. ANDERSON, superintendent of Skelly Oil Company's El Dorado, Kansas, refinery has been made manager of refining. He is moving his headquarters to company general offices at Tulsa. Justus O'Reilly who has specialized on cost and yield analysis matters becomes the new superintendent at El Dorado. J. Y. Haslam has been promoted from resident engineer at El Dorado to chief engineer for the division.

WILLIAM A. BADEN, vice president, Anchor Petroleum Co., Tulsa, has been elected president of the concern and its various divisions. At 37, Baden becomes one of the oil industry's youngest major executives. He was one of four founders of the company in 1940. The directors also named J. S. Feroe, assistant to the vice president in charge of sa'es of the Hanlon-Buchanan Co., to head Anchor's natural gasoline sales department.

In 1933 Baden became connected with the Warren Petroleum Corp., leaving in 1940 to form, together with Paul R. Smith, L. F. Rooney and B. B. Blair, the Anchor Petroleum Co. The concern operates natural gasoline plants in Okalhoma and Louisiana, and has branch offices in Minneapolis, Des Moines, Chicago, Kansas City, Houston and Laredo, Texas. Anchor does considerable export business which has increased since the close of the war. During the war the concern was a large supplier of components of aviation gasoline and synthetic rubber.

Wm. A. Baden

J. S. Feroe

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Steve Davidson to Retire

W. D. (STEVE) DAVIDSON, director, vice-president and chief engineer of the Emsco Derrick & Equipment Company, retires on the first of June after 23 years of service with that company. Steve is in the best of health and states that he will catch up on his hunting and fishing and take a long time doing it. His oil tool experience started with the Union Tool Company in 1912. In 1923, at the inception of the Emsco Tool Company, he became chief engineer.

Tube Turns Salesmen Promoted

JACK GREEN, sales manager of the welding fittings division of Tube Turns, Inc., Louisville, Ky., has announced the appointment of James H. Withers as district manager in charge of the firm's San Francisco and Los Angeles offices. He will divide his time between the two.

S. M. (Skid) Spears, Jr. has been promoted to assistant district manager of the New York office.

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GEORE L. PARKHURST has been elected to the presidency of Oronite Chemical Company, subsidiary of Standard of California which markets chemicals derived from petroleum. He succeeds R. G. Smith, who will continue with Oronite as a member of the board of directors.

Parkhurst formerly was vice-president in charge of products and processes. He is noted for his work with the Petroleum Administration for War, where as assistant director of refining and later contract executive, he was responsible for plant approvals, contracts and prices in connection with the 100 octane aviation gasoline program. Prior to the war, Parkhurst was with Standard Oil Company(Indiana) for many years and was active in chemical circles in the Chicago area and elsewhere.

THOMAS WAVERLY PALMER, counsel for the Standard Oil Company of New Jersey, was elected president of the Pan American Society of the United States, Inc., at its annual meeting. He succeeds Frederick E. Halser, president of the Continental Bank and Trust Company of New York.

Mr. Palmer is a former president of the Venezuelan Chamber of Commerce of the United States. He served as attorney for the Chilean Exploration Company, as well as counsular agent at Chuquicamata, Chile, from 1919 to 1921.

ROBERT B. CURRAN, manager of the Carter's northwest division, has been named a director of the company. His election at 37 makes him one of the youngest Carter employees in a major executive post.

Following graduation from the University of Oklahoma in 1933 he went to work for Carter in the geological department. In 1935 he was transferred to the scouting division and in 1938 was made chief scout. In March, 1943, he was appointed assistant to the president.

He has been in the northwest division at Billings, Montana, since September, 1944, as assistant and division manager.

J. A. WALKER has been appointed manager of the credit department of Standard of California succeeding H. E. Martline, who is retiring after 27 years with the company, the past 14 as department manager. Since Walker joined Standard as a credit clerk in 1921 he has held every position in the credit department.

In 1944 he developed a book and sound film on the psychology of credits titled "What Would You Say?". Although originally designed for company training, the book and film received wide recognition and are currently in use in 21 colleges and universities and have been shown to hundreds of commercial organizations throughout the country.

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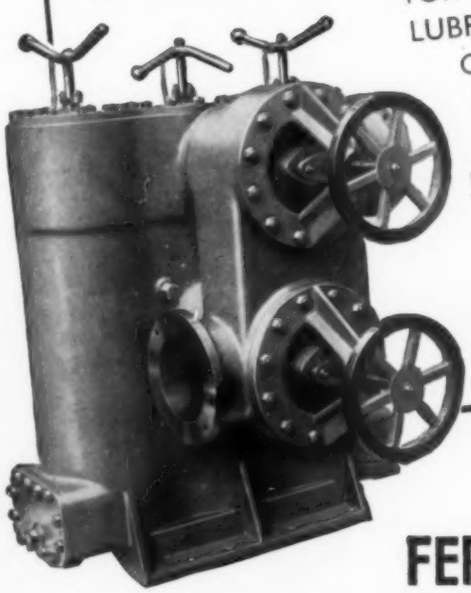
Illustration shows a 10" TRIPLE PACK 'CLINSOL' STRAINER WITH BYE-PASS VALVE



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This is a radically different development of the High Speed Centrifugal Separator

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To Build Small TCC Plant

CATALYTIC CONSTRUCTION AND ENGINEERING COMPANY, recently incorporated in Delaware, will build the country's first small-scale Thermofor Catalytic cracking plant, T. Ellwood Webster, president has announced. The plant, to be built for Leonard Refineries, Inc., Alma, Mich., incorporates the latest in catalytic unit design scaled to the requirements of the small refiner, he said. Leonard Refineries, headed by Reid Brazell, is a Houdry Process Corporation licensee.

Simultaneously, Mr. Webster announced that his company is offering a maintenance service for refineries of all sizes, including all types of refining units, in addition to the design and construction of new refineries, and the modernization of existing plants. The maintenance service covers major operations including catalyst change on fixed-bed units, removal and repair of tubes, retubing periodic inspection and repair of complete units, repair and renewal of trays in towers, replacing of overhead or underground lines, and service on turbo-compressors and motor-operated valves.

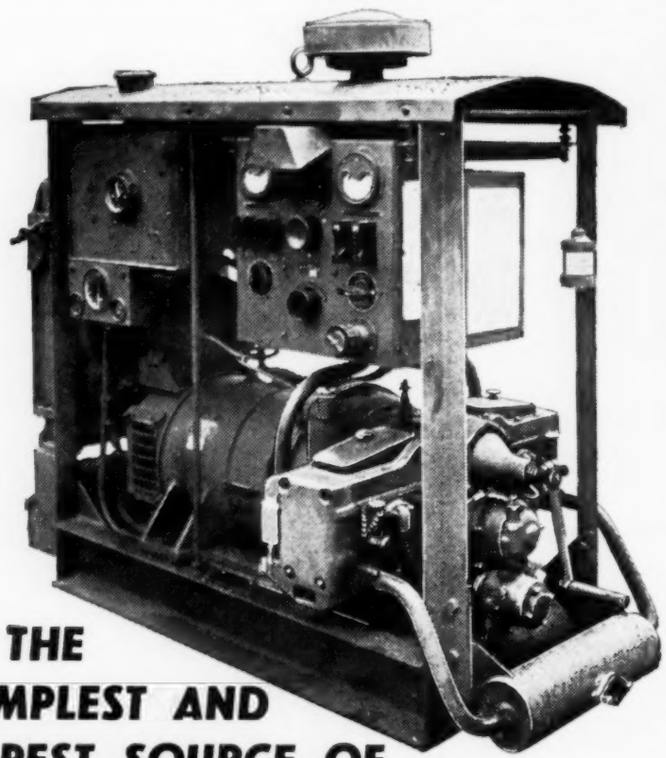
Moore Names Vice President

HOMER J. WOOLSLAYER has been appointed vice president of Lee C. Moore Co. in charge of oil country activities. He has been with the company since 1923 and has been chief engineer since 1941. Mr Woolslayer's headquarters will continue in Tulsa.

DR. T. A. LINK has been appointed chief geologist of Imperial Oil Ltd., succeeding O. C. Wheeler who recently was elected a director of International Petroleum Co., Ltd. Dr. Link has been with Imperial since 1919. He was in charge of the party which located the discovery well in the Northwest Territories.

After two years on leave in which he obtained his doctorate he was made geologist in charge of western Canada development. He has been assistant chief geologist since 1944.

T. C. DAUPHINE has been made eastern manager of product development for the Oronite Chemical Company, a subsidiary of Standard of California. Dauphine, former research engineer for the California Research Corporation, will do technical service work on products now marketed in addition to product development work. His offices will be at 30 Rockefeller Plaza, New York City.



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CUB DIESEL

The horizontal design of the "CUB" diesel gives inherent balance. It is a high-speed low-weight engine of 1006 c.c. capacity with a continuous heavy duty rating of 12 b.h.p. at 1,800 r.p.m. The "CUB" will start from cold, it will give good service for many years with practically no attention and uses very little fuel.

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FROM LEAKS
INSTALL LADISH
Forged Steel Fittings

Drop Forged fittings provide longer life and increased endurance. Greater metal soundness, finer grain structure and increased strength result from the high impact pressures inherent in the Drop Forging process.

Added resistance to the shocks, strains and stresses . . . imposed by pressure, temperature, vibration, expansion and contraction . . . is obtained by using forged steel fittings. Ladish Controlled Quality Forged Steel Fittings provide additional advantages of thorough metallurgical control and close inspection of physical dimensions.

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Heat Exchangers for all duties. Crude-to-Residue Exchangers, Side Stream Exchangers, Oil Coolers, etc. Vapour Condensers for vacuum, topping or cracking plants. Final Condensers (water circulated) and Partial Condenser (circulated with incoming crude). Weir Refinery Equipment includes Oil Pumps for all duties, Steam Ejectors for Vacuum Stills, and all auxiliaries for Feed pumping and Feed heating. Write for Catalogue Section 8 "Weir Pumps for the Oil Industry" and Publication No. 38 "Weir Power Plant Auxiliaries."

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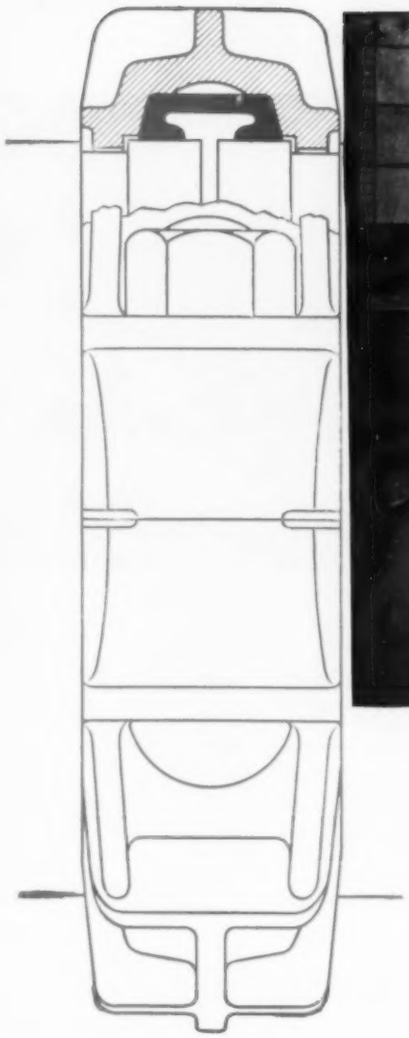

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Pressures from zero to 2 tons per sq. in.
Sizes 1" to 84" diameter.

Extensively used in the Oilfields; also in mines and by Gas and Water Authorities.

POSITIVE — SELF SEALING — COMPETITIVE IN PRICE. FULL RANGE OF FITTINGS, INCLUDING:—

Adjustable Bends from 0° to 45°, 10° Setting Pieces, Tees, Crosses, Y's, Elbows, Flange Adapter Joints, Blank Ends, Screwed-to-Victaulic Adapter Pieces, Reducers, Grooving Tools for cutting and grooving Steel Pipes on Site. Closer Joints.

Made in several countries, for sale in those countries, under license from the owners of the world patents, The Victaulic Company Ltd., Brook House, 113, Park Lane, London, W.1, and manufactured by them in England.

Telephone: Mayfair 9641. *Telegrams*: Victaulic, Audley, London. *Cablegrams*: Victaulic, London.

VICTAULIC

PIPE JOINTS

THE WORD VICTAULIC IS OUR REGISTERED TRADE MARK THROUGHOUT THE WORLD

CHARLES E. ARNOTT, vice president in charge of central marketing and Arthur T. Roberts, treasurer and comptroller, retired from Socony-Vacuum Oil Company Inc. on December 31st.

Mr. Arnott's retirement comes after 50 years in the oil industry. He started in 1896 in the legal department of the Standard Oil Company of New Jersey and in 1903 became associated with the Vacuum Oil Company. In 1912 he became director of the company and was made president in 1930. From 1931 to 1935 he was president of Socony-Vacuum. In recent years, Mr. Arnott has been devoting all of his time to supervising the marketing activities of the company in the Middle West.

Mr. Roberts began his career in the oil industry nearly forty years ago in the accounting department of the Standard Oil Company. In 1911, following the dissolution, he was assigned to the auditing staff of the Standard Oil Company of New York. In 1919 he was elected assistant treasurer and in 1935, he became treasurer of Socony Vacuum. In 1938, Mr. Roberts was elected comptroller and in 1939 a director.

PROTECTION AGAINST FIRES and EXPLOSIONS

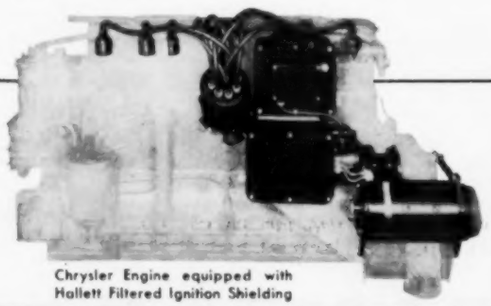
CAUSED BY SPARKS AND OTHER IGNITION LEAKAGE AND DEFECTS

Hallett Filtered Ignition Shielding is proving an effective safeguard against dangerous fires and explosions caused by sparks or high frequency leakage emanating from distributors, spark plugs, coils, wires, generator terminals, and voltage regulators on the internal combustion engines used in oil field drilling and pumping operations.

By completely housing the entire electrical equipment (see illustration), Hallett Shielding eliminates any possibility of sparks; leakage or fouling that might ignite highly combustible liquids or gases.

In addition, it moisture-proofs and protects the ignition system itself against water, oil, corrosion and other damage; assuring full engine power, higher efficiency, lower operating and maintenance costs, and longer, trouble-free life for the complete power unit.

Now in oil field service for protective purposes, Hallett Shielding is available in "packaged" kits, ready for installation on most standard types of internal combustion engines. Write the nearest Hallett office for complete information.



Chrysler Engine equipped with Hallett Filtered Ignition Shielding

HALLETT MANUFACTURING COMPANY
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Cable Address: HALMFG. *Established 1916* *Code:* Bentley's

HALLETT FILTERED IGNITION SHIELDING For Every Type Of Transport Engine

Warner Norton Grubb

COMMODORE WARNER NORTON GRUBB, USNR, foreign marketing executive of Standard Oil Company (New Jersey), has been awarded the Legion of Merit for wartime services in petroleum supply operations in the European theatre. The award was presented by Secretary of the Navy Forrestal for "exceptionally meritorious conduct in the performance of outstanding services to the Government."

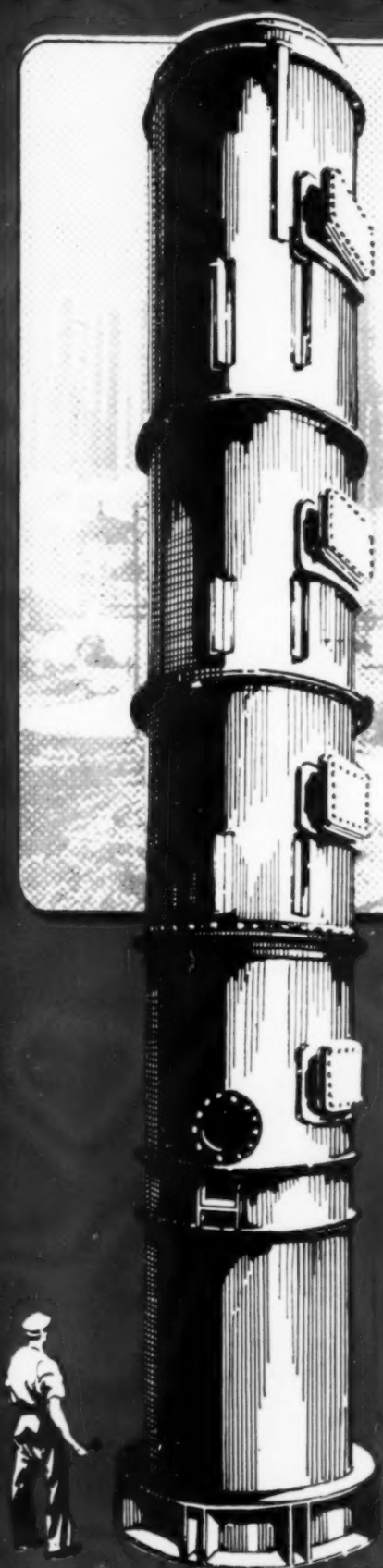
Commodore Grubb was charged with the organization and maintenance of efficient petroleum supply operations for naval forces in Europe and was instrumental in perfecting security measures for tanker communications.

Officers of Houston Nomads

HOUSTON chapter of Nomads has elected the following officers to serve during the current year: Charles W. Thornhill, Thornhill-Craver Co., president; Charles E. Richards, Gray Tool Co., vice president; H. E. Estes, Reed Roller Bit Co., executive secretary; Geo. F. Tyson, Jones & Laughlin Steel Corporation, secretary and treasurer; J. L. Speece, Gardner-Denver Co., assistant secretary-treasurer; Herschel J. Wood, Lebanon Steel Foundry, sergeant-at-arms; C. B. McDonald, A-1 Bit & Tool Co., deputy sergeant-at-arms; C. E. Whitney, Baker Oil Tools Inc. and Tom W. Nelson, Oil Weekly, regents.

WILLIAM F. BONNER has been appointed general manager of Midco Tool & Supply Company of Oklahoma City, a subsidiary of Aireon Manufacturing Corporation, Randolph C. Walker, president of the company has announced. Plans contemplate the expansion of Midco's activities throughout the U. S. and development of export trade to Mexico and Latin-America as well as to the Dutch East Indies.

TO THE OIL PLANT ENGINEER



Vours the problem-
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Because Harveys specialise in the fabrication of Plant for the Industrial and Chemical Trades. Modern welding equipment and an experienced staff are available for the production of installations to any of the recognised codes, including A.O.T.C., Lloyds, A.P.I. and A.S.M.E. with, if necessary, X-ray examination and stress relieving by heat treatment.

Harveys fabricate from mild or alloy steels, nickel and clad steel. Shop assemblies range from a few inches to 15' 0" in diameter, pressures from absolute to 3,000 lbs. per sq. in.

If you have plant to be built, consult Harveys for all items of welded plate work. High grade designs can be developed from your specifications.

A typical example is the welded 60' x 4' 6" Fractionating Tower illustrated here. Send for Catalogue E.750.

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For more than half a century these characters have symbolized quality petroleum products to the people of China.

Standard-Vacuum pioneered the distribution of petroleum products in the Far East. For over fifty years we have been the leading manufacturer and distributor of high grade petroleum products in that area.

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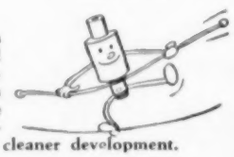
AIRETOOL
TUBE CLEANERS

. . . Industry's Choice for the DIFFICULT JOBS

because— Airetool's Balanced Rotor—

BALANCED ROTOR



eliminates friction in the powerful Airetool motor so that all power is directed against the load — an *exclusive* Airetool tube cleaner development.

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because— Airetool's Power Seal— increases motor efficiency, prevents power waste, produces constant torque at low speeds, eliminates dead centers, and allows motor to be loaded down to 50 rpm without stalling — another *exclusive* Airetool feature.

because— Airetool's New Form Cutters—

NEW FORM CUTTERS

eliminate any tendency to track . . . clean thoroughly and quickly without danger of damage to tubes — another *exclusive* Airetool development and a valuable contribution to industry.

TUBE EXPANDERS

Airetool expanders are precision built of fine heat treated alloy steels. They are designed to efficiently perform any tube rolling operation.

Write Dept. WP for Helpful Bulletins on tube cleaners and expanders.

AIRETOOL MANUFACTURING COMPANY

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ARTHUR B. BROWN arrived in Venezuela in December last to succeed Carl T. Newcomb as resident manager for Richmond Exploration Company. Mr. Brown is a Californian by birth and obtained his Bachelor of Arts degree in geology from the state university at Berkeley in 1927. After working two years at Goldfield, Nevada, for an independent mining engineer, he returned to the university for a seamster of post graduate work. In 1930 he entered the oil business and has been in it ever since.

Arthur B. Brown

His first position was with the Standard Oil Company of California in the state of California. His next step took him abroad, in 1933, when he went to Arabia for the California Arabian Company (since called the Arabian-American Company) to do general exploratory reconnaissance work. In 1935 he was back in the United States and spent the next three years as geologist for the Standard Oil Company of Texas in that state. The year 1938 found Mr. Brown abroad again, this time in northcentral Sumatra with the Netherlands Pacific Petroleum Maatschappij, where he remained until October, 1941.

Early in 1942, he went to Louisiana for the California Company and remained there until January, 1945. Then he was assigned to Richmond Petroleum Company's San Francisco office which undertakes the management of its two South American companies, one of which is Richmond Exploration Company of Venezuela. In the light of his experience, the next step, that of appointment as resident manager for Richmond Exploration Company of Venezuela, was a logical promotion. Carl T. Newcomb, former resident manager in Caracas, has been transferred to the company's offices in San Francisco.

RAY A. CARTER has formed an oil brokerage business with offices at 60 Wall Street, New York. Mr. Carter had been with Cities Service for many years. He was assistant to vice president J. S. Cordell, and served as coordinator and buyer.

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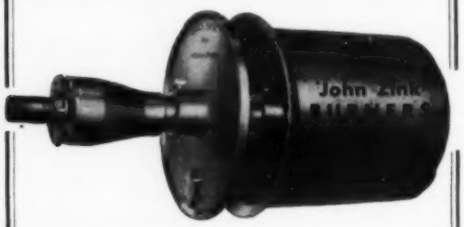

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— Treating Furnaces — Industrial Boilers
— Heating Boilers — Domestic Furnaces
Refinery Stills and Furnaces

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CALIFORNIA is a modern bonanza of oil. This area has produced vast stores of petroleum products to supply the needs of the West Coast and Pacific areas. Further wild catting developments in this area will supplement present reserves, to supply the ever increasing demands of the West Coast, which is destined for tremendous post-war expansion, and throughout the Pacific world.

In the past years California's rich fields have been producing large quantities of much needed oil and are exceeded only by the ten combined districts of the state of Texas in past and current production and in proven reserves.

In the past 43 years, representing most of California's oil history, Youngstown has contributed a large share of its drill pipe, casing, tubing and line pipe. The continued trend toward deeper drilling and the problems involved therein indicate a future need for larger quantities of better pipe. To meet those needs, Youngstown can be depended upon to supply the quality and the quantity of tubular goods required, no matter how severe those requirements may be.

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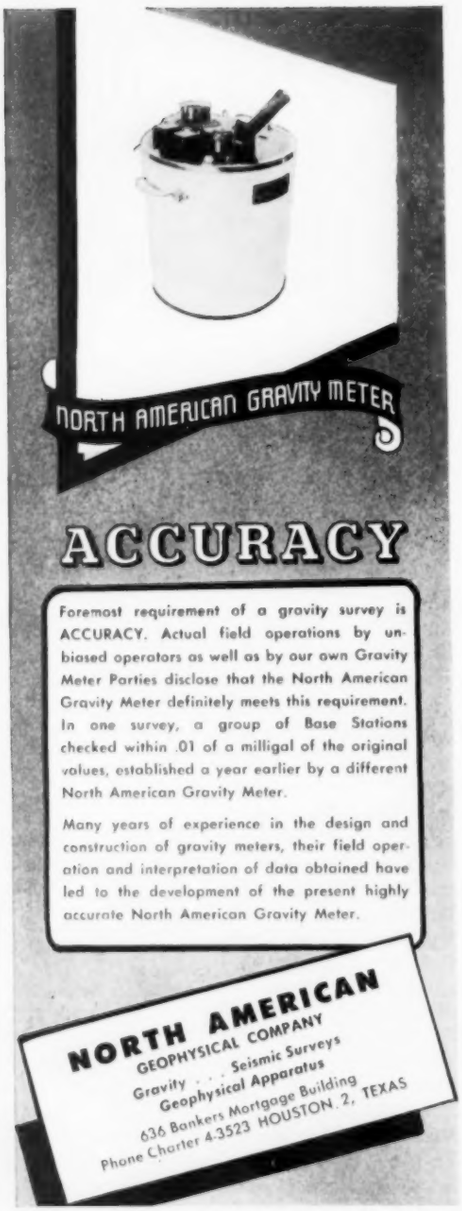
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Foremost requirement of a gravity survey is ACCURACY. Actual field operations by unbiased operators as well as by our own Gravity Meter Parties disclose that the North American Gravity Meter definitely meets this requirement. In one survey, a group of Base Stations checked within .01 of a milligal of the original values, established a year earlier by a different North American Gravity Meter.
Many years of experience in the design and construction of gravity meters, their field operation and interpretation of data obtained have led to the development of the present highly accurate North American Gravity Meter.
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Phone Charter 4-3523 HOUSTON 2, TEXAS

New Work on Petroleum Production

PARK J. JONES, consulting engineer, Houston, Texas, is preparing and Reinhold Publishing Co. will publish a five-volume work on Petroleum Production. Sub-titles of these volumes are: I, Mechanics of Production of Oil, Condensate, Natural Gas; II, Optimum Rate of Production; III, Reserves and Well Spacing; IV, Condensate and Natural Gas Production; V, Primary and Secondary Production Methods.

Volume I, Petroleum Production: Mechanics of production of oil, condensate and natural gas (231 pages, $4.50) has just come off the press. In this volume the author assembles the available information on the volumetric and phase behavior of fluids in reservoirs; and to make the information more intelligible to field personnel he expresses them in terms of barrels of oil and standard cubic feet of gas instead of in CGS units. The nine chapters of the book deal with the characteristics of pay and non-pay, permeabilities, use of electric logs, displacement factors and related topics.

Running through the book is Mr. Jones' insistence that more recovery is achieved by producing as much oil and condensate as possible before the driving fluids - water or gas - break through into the well; hence the practical need for understand-fluids.

Volume II, Optimum rate of production, is scheduled for publication in September.

Opens London Office

RHEEM MANUFACTURING COMPANY is establishing London offices it was announced by W. E. Zander, vice president in charge of the company's foreign activities. Lanning Roper, recently returned from the U. S. Navy, will be in charge of the London office. He was accompanied to England by A. Lightfoot Walker, executive assistant to R. S. Rheem, president.

Lightfoot Walker formerly was general manager of Rheem's three Australian plants and helped establish new plants for the company at Rio de Janeiro and Mexico City. The company has a number of sites in prospect where operations will be established before the end of the year.

The Rheem company abroad operates through subsidiaries in association with nationals of the country which it enters.

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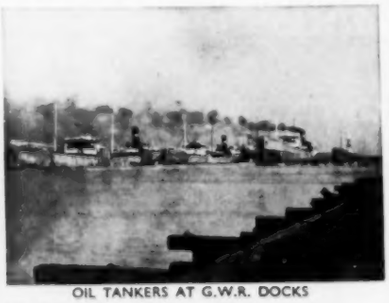
OIL DISTRIBUTION

The Great Western Railway Company's South Wales Docks at CARDIFF, SWANSEA, NEWPORT, BARRY, PORT TALBOT and PENARTH (Harbour) are excellent terminals for oil distribution.



OIL TANKERS AT G.W.R. DOCKS

SITES FOR NEW DEPOTS ARE AVAILABLE

For information apply to the respective Dock Managers or to :—

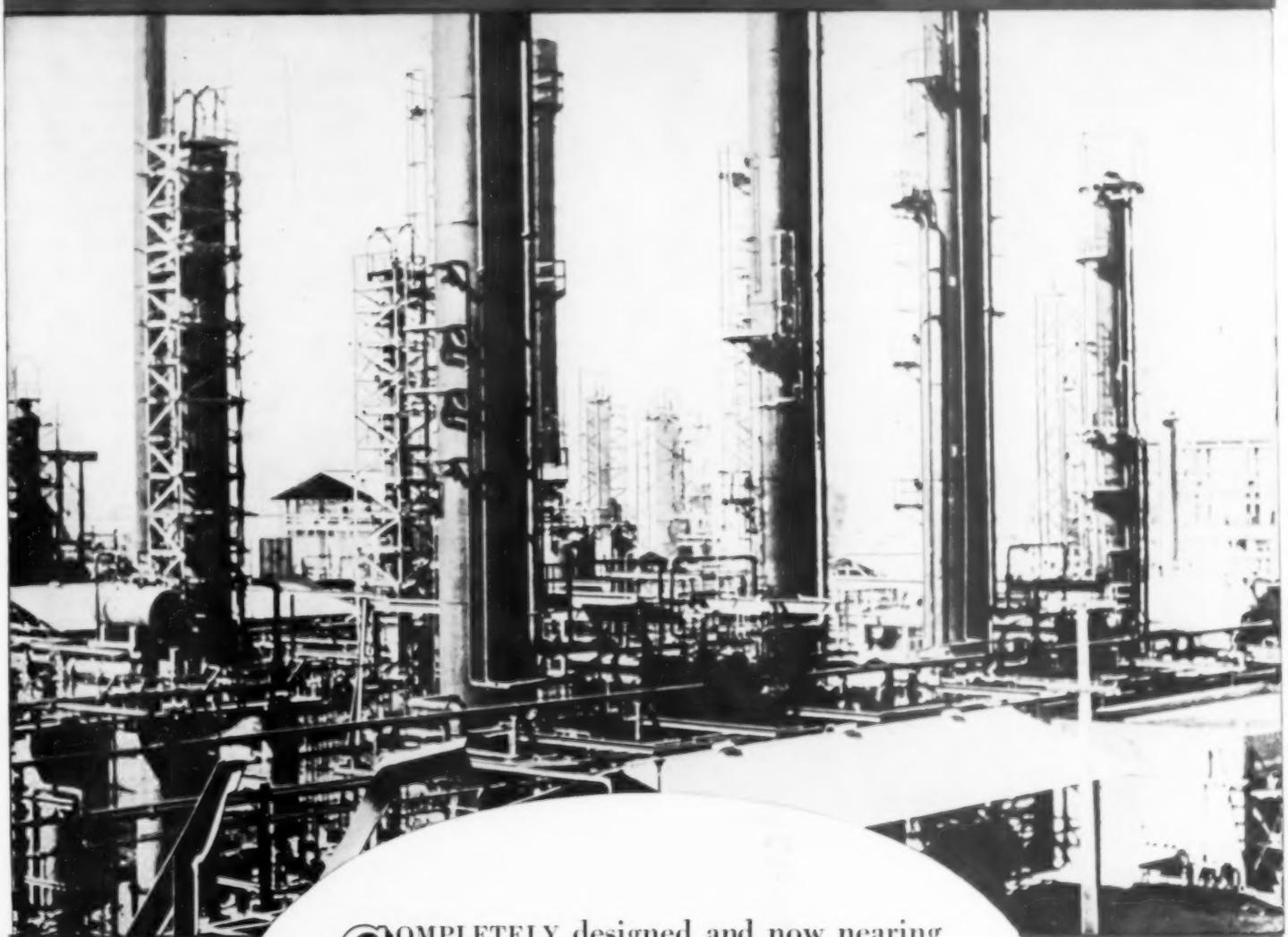
Chief Docks Manager,
Great Western Railway,
CARDIFF

JAMES MILNE, *General Manager.*
Paddington Stn. London, W.2

ERRATUM

In the April issue of World Petroleum the Audco-Nordstrom advertisement inadvertently listed the European licensee as Audco Engineering Co., Ltd. The correct name is Audley Engineering Co., Ltd. Audley has been the European licensee for many years, to European markets, as manufacturer and distributor of Audco-Nordstrom Valves under the name Audco Valves.

UNDIVIDED RESPONSIBILITY IN ONE ORGANIZATION



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★ Engineers and Contractors ★

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Economics Advisory Committee

First meeting of the new Economics Advisory Committee of the Interstate Commission was held at Tulsa during the recent compact commission meeting. Seated at the table, left to right, are: Dr. Joseph E. Pogue, Fred Lott, A. J. McIntosh, J. M. Sands, Richard J. Gonzales, chairman of the committee, Fred Van Covern, and Joseph Salmon. Standing are, H. J. Struth, Lynn Wolfe, R. A. Hendricks, James V. Brown, Stewart P. Coleman and John Boatwright.

Additive Engine Oils

THE recent introduction of additives for engine oils have proved to be an important advance in the science and practice of lubrication. The Petroleum Educational Institute, Los Angeles, has now brought out a book by G. A. Zamboni, which is intended to give a short and simple explanation of detergent oils and detergent purging fluids to maintenance personnel at service stations, car and truck dealers, repair shops and in general to all operators of both diesel and spark-type engines.

The subject of oil additives and why and how they are added to engine oils is covered under 43 headings from which an average maintenance man can pick the answer to practically any question relating to the use of engine oils and what to do when confronted with lubricating trouble. The compiler has not shied away from technical and scientific terms, but everything is explained in such plain language, reinforced by a great number of pictures and simple drawings, that anyone who has intelligence enough to be allowed to oil an engine can understand what is meant. The book is priced at $2.00.

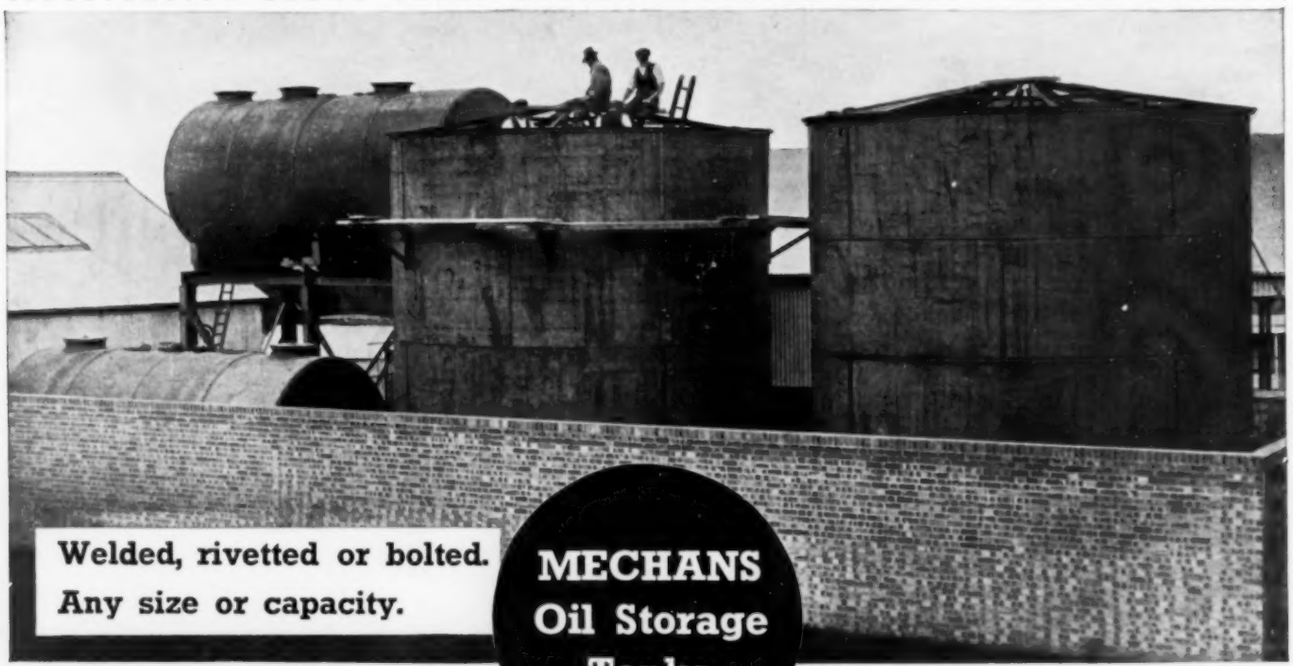
Bowser Sales Organization

Robert L. Ledbetter has been appointed supervisor of oil field equipment sales for Bowser, Inc., with headquarters in Dallas. Mr. Ledbetter has been a petroleum and meter engineer in the southern oil fields for more than fifteen years. Carlos E. Crawford, who recently joined Bowser will sell Bowser oil field equipment in the Wichita Falls, Texas, area.

Other representatives are: R. K. Franklin, Houston; C. G. Rose, Oklahoma City; L. E. Pietzker, Dallas; E. O. Johnson, St. Louis; and F. C. Enz, Evansville, Indiana.

WILLIAM H. STRANG has been appointed executive secretary of the Petroleum division of the American Institute of Mining and Metallurgical Engineers with Dallas offices. The post has been vacant since last June when Chester Naramore resigned. Mr. Strang was with Oil Weekly before he entered military service.

ILLUSTRATION SHOWS TANKS DURING ERECTION AT OIL SERVICE STATION



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This greater scope of operations has built up an intimate practical understanding of latest processes, methods, layouts, equipment, materials and sources of supply. It provides Pritchard engineers with an outstanding faculty for applying and adapting techniques from one field or type of service to another.

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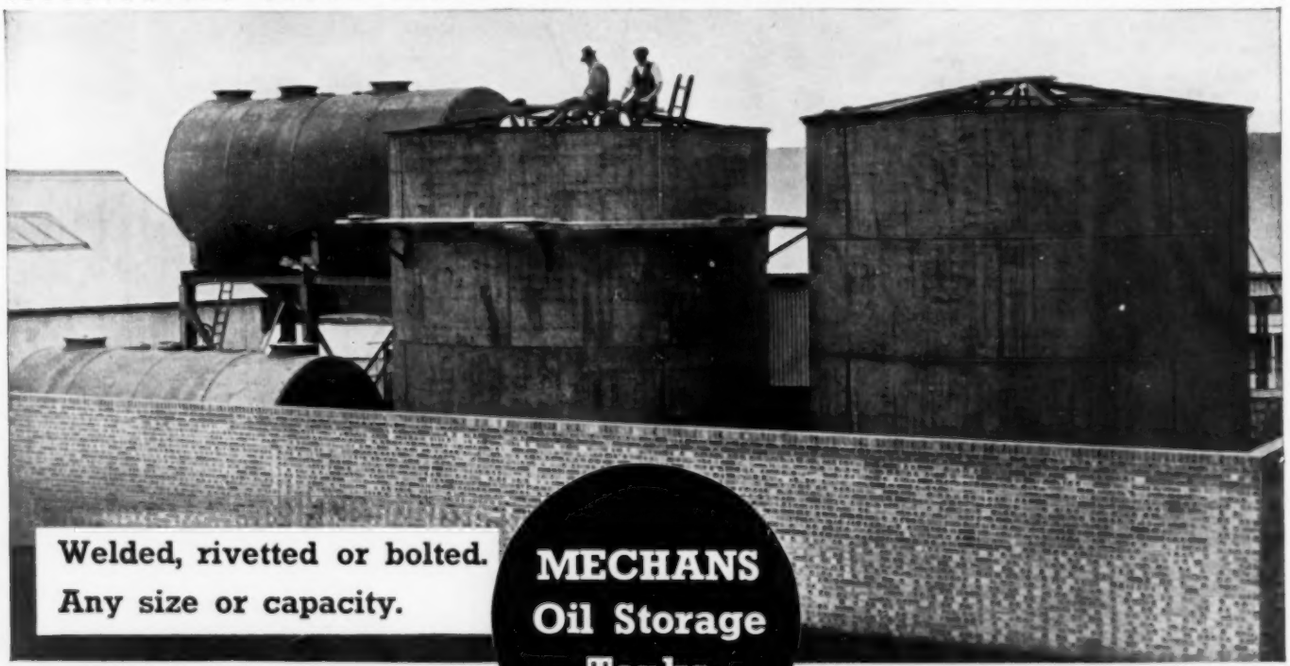

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Unusual versatility and ingenuity are the result. Consult us on your next plant project or equipment

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FOR THE CHEMICAL • PETROLEUM • GAS AND POWER INDUSTRIES
Manufacturers of Mechanical and Atmospheric Cooling Towers

FIDELITY BLDG., KANSAS CITY 6, MISSOURI

THE Russian Academy of Sciences Bulletin recently reviewed the work of Dr. V. N. Ipatieff in the development of catalysts and high pressure processes. This is the first time his name has been mentioned by the Academy in recent years since his expulsion as a member in 1937 for refusal to renounce his American citizenship and to return to Russia. Dr. Ipatieff has been associated with Universal Oil Products Co. at Chicago since 1930. He is responsible for a number of inventions in connection with catalytic processes.

Receive Navy Award

FOR distinguished service in the research and development of naval ordnance, for development and design of the U. S. Navy's Mark I flame thrower and its devasting fuel — jellied gasoline — the Standard Oil Development Company recently was presented with the Naval Ordnance Development Award. In announcing the award, Vice Admiral G. F. Hussey, Jr., chief of the Navy Bureau of Ordnance, also named as recipients of the "Certificate for Exceptional Service", Robert P. Russell, president of the Development Company, and seven other company scientists and engineers tributed.

The dramatic story of the flame-throwing fire buggies began soon after war started in the Pacific. The idea came to Mr. Russell and N. F. Myers, assistant chief engineer of the Esso Engineering Department, while returning on a train from a demonstration of flame throwers at Edgewood Arsenal in January, 1942.

By August, 1942, the oil scientists had remodeled the M-1 portable flame thrower so that it would fire both liquid and thickened fuel. In July, 1943, it first came into its own in the Solomons campaign, where in a few seconds, it crushed the fanatically fierce resistance which had stalled a whole military operation on New Georgia.

The evolution of the flame thrower from the start of the war to the close was a study of contrasts. From a portable device that carried but four gallons of liquid fuel with a range of only 20 yards, the flame thrower became a decisive offensive weapon — an armored tank that carried almost a ton of destructive jellied gasoline which could be fired with devastating effect into otherwise impenetrable positions from a distance of 100 to 150 yards.

New Astem Committees

Three new technical committees are being organized as a result of recent meetings of Committee D-2 of the ASTM. New committees are: H on Light Hydrocarbons of which W. G. Lovell of General Motors Research Laboratories is to be chairman and R. C. Alden of Phillips Petroleum Co., secretary; J on Aviation Fuels headed by G. K. Brower of American Airlines; and K on Cutting Oils headed by O. L. Maag of Timken Roller Bearing Co.

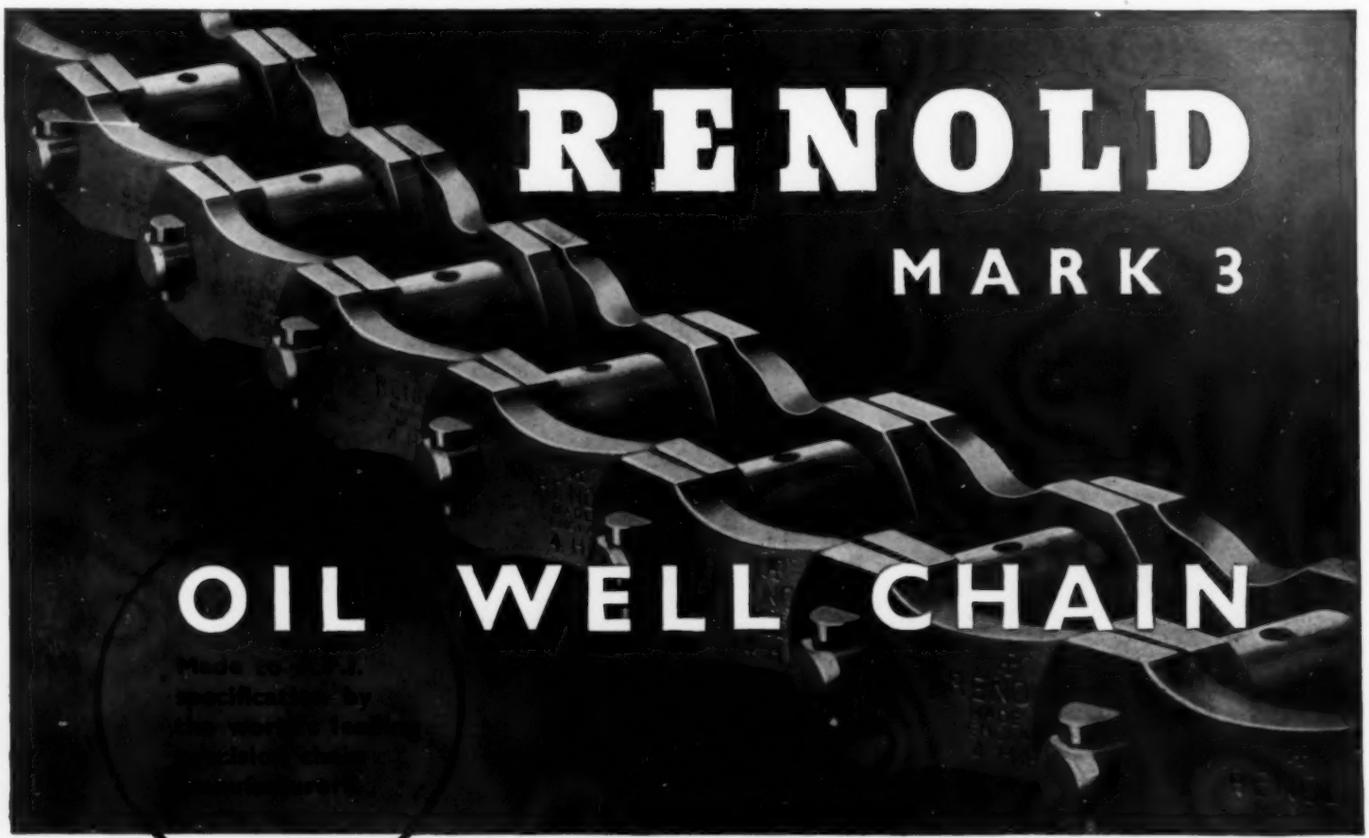
A symposium on oil procurement practices with reports of five consumers will feature the annual meeting of the society of Buffalo June 24-28. Dr. H. C. Dickinson of the U. S. Bureau of Standards will be honored guest at the annual D-2 dinner.

New Petroleum Register

THE 24th edition of the Petroleum Register, which is now ready for delivery, contains 600 pages of data regarding active oil companies throughout the world. In the case of the most important companies the Register gives their history, capital and corporate structures affiliations and subsidiaries. Concessions, properties, manufacturing transportation, and distributing facilities are recited.

The new edtion contains more than the normal number of changes because no Register was published in 1944 in view of the war-time paper shortage. Special attention has been given to the South American section.

Orders may be placed with World Petroleum, 2 West 45th St., New York, 19, or World Petroleum, Georgian House, St. James, London, S. W. 1. Price postpaid is $10 in the United States and $12 elsewhere throughout the world.



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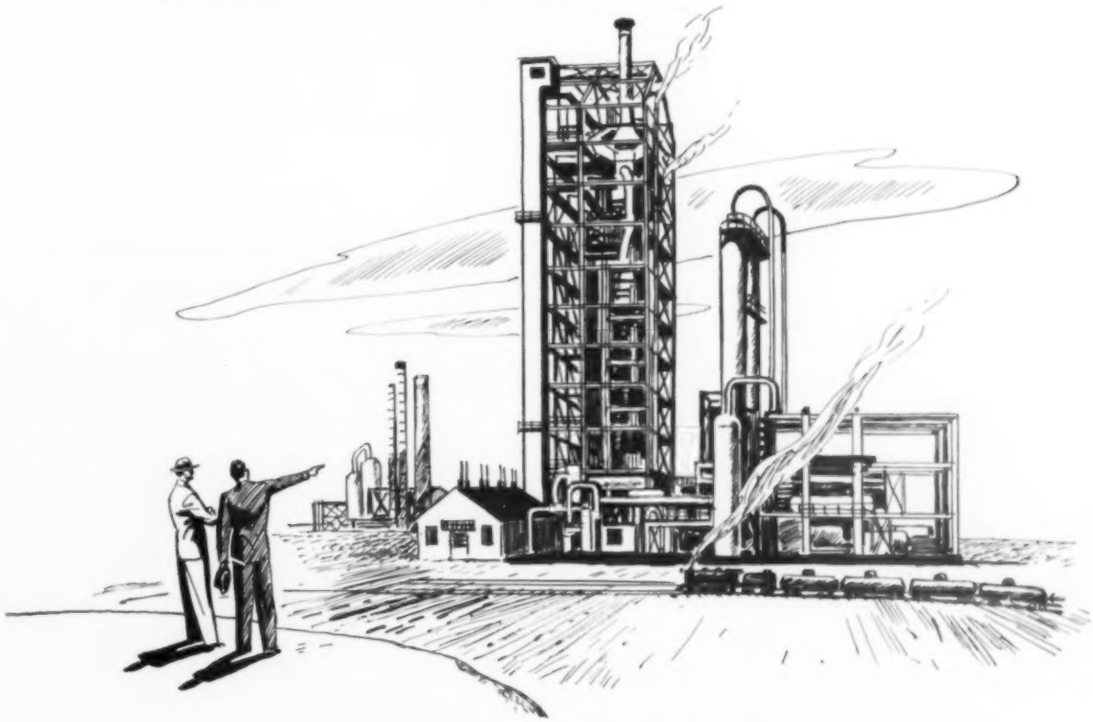

A. TIDE WATER ASSOCIATED OIL COMPANY

New York Tulsa San Francisco

F. O. PRIOR has resigned as president of Stanolind Pipe Line Company. B. C. Clardy was elected president and members of the board of directors. Mr. Prior will retain his present position as chairman. Mr. Clardy will reside in Tulsa, Okla.

PHIL P. GABY, former California supervisor for Geophysical Service, Inc., has joined Standard of California as a consulting geophysicist. Gaby, who has worked in California since 1934, is a graduate of Southern Methodist University and did post-graduate work at the University of Texas.

ELMER THUENER, former advertising assistant with Tide Water Associated Oil Company, just recently released from the service, has returned to his old position with the company. Mr. Thuener entered the military service in March 1941 and was assigned to the Adjutant General section with the Replacement Training Command of the Army Ground Forces. He spent fourteen months in the Pacific while in active service.

TWO specialists of Standard Oil Company (N. J.) received the Exceptional Civilian Service Award from the Army Service Forces for their wartime assignments of expediting petroleum supplies to the fighting fronts. Colonel James E. McNary, received the award as a special advisor to the Quartermaster General for his work in introducing and developing the first portable pipelines in the North African campaign, special heavy drums for handling gasoline in exposed areas, and for developing a field fueling device that was used for planes, tanks and combat vehicles.

Harold O. Laffitte, an engineering supervisor in the Esso tanker fleet, won his citation for exceptional service in expediting the unloading of tankers in invasion ports.

Buys Patterson-Ballagh Stock

E. S. DULIN, president of Byron Jackson Co., and J. C. Ballagh, president of Patterson-Ballagh Corporation, jointly announce the acquisition by Byron Jackson Co. of all the outstanding stock of the Patterson-Ballagh Corp. Patterson-Ballagh will operate as a separate division of Byron Jackson Co., which has owned a minority interest in Patterson-Ballagh since its formation in 1927.

The merger of these companies will supplement the efforts of each in the expansion programs now planned for domestic and foreign operations of the oil tool and pump divisions of Byron Jackson Co. Patterson-Ballagh introduced rubber casing and drill pipe protectors in 1927. Since then many additions to the line of products have been made and are being contemplated, including the wire line guide, pipe wiper, swivel and traveling block bumpers, and the mud gun. In development are many items for producing wells, including a deep well swab, sucker rod wipers, and wire line wipers.

No immediate changes in management, personnel or sales distribution, are contemplated. The manufacture, sales, and distribution of Patterson-Ballagh items will remain under the Patterson-Ballagh name. J. C. Ballagh wil continue as president and general manager and D. G. Miller as secretary. Mr. Miller is the inventor and designer of many of their most important items.

Carbon Black Substitute Found

A WHITE substitute for carbon black in the compounding of rubber has been developed by B. F. Goodrich Co. Ethyl silicate made from sand and alcohol is burned to a fine, white, partly translucent powder.

Under the electron microscope the "fumed silica" particles have the same size and shape as carbon black particles and perform exactly in the same way to give rubber compounds added strength and tear and abrasion resistance. With the new product strong rubber can be made in any desired color. Costs still are higher than carbon black but mass production is expected to make the product competitive.

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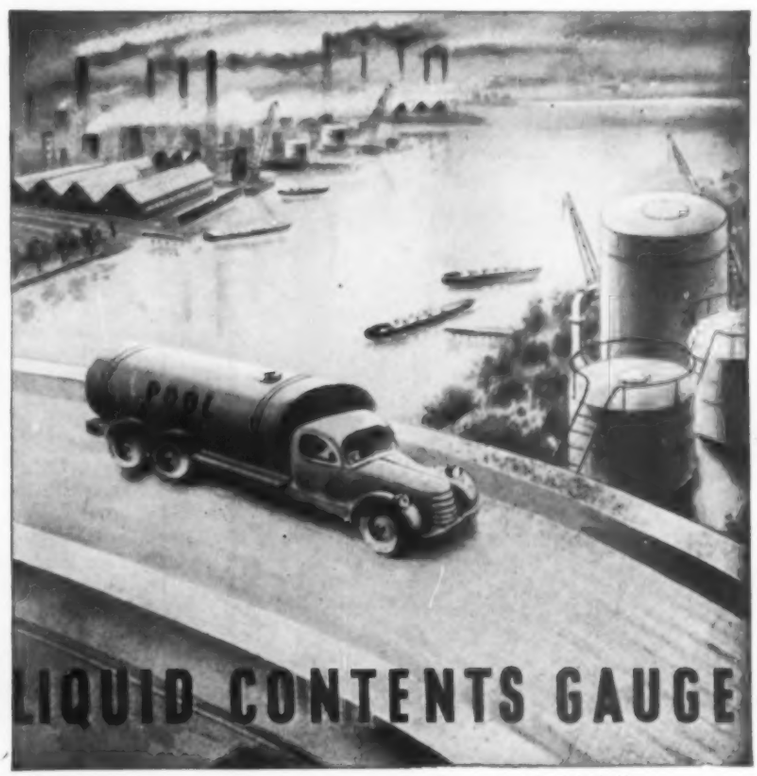

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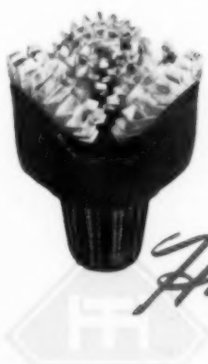

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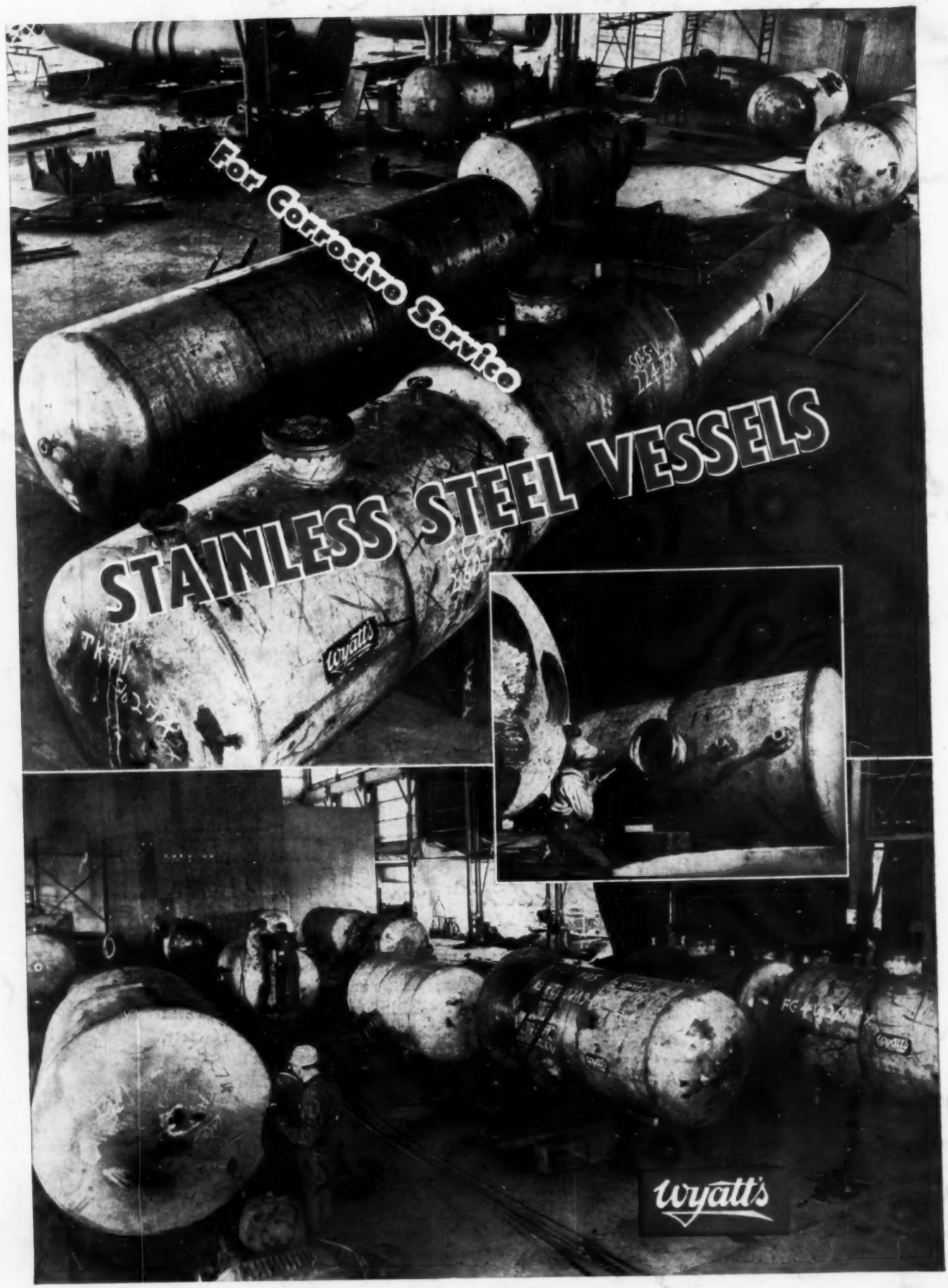

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